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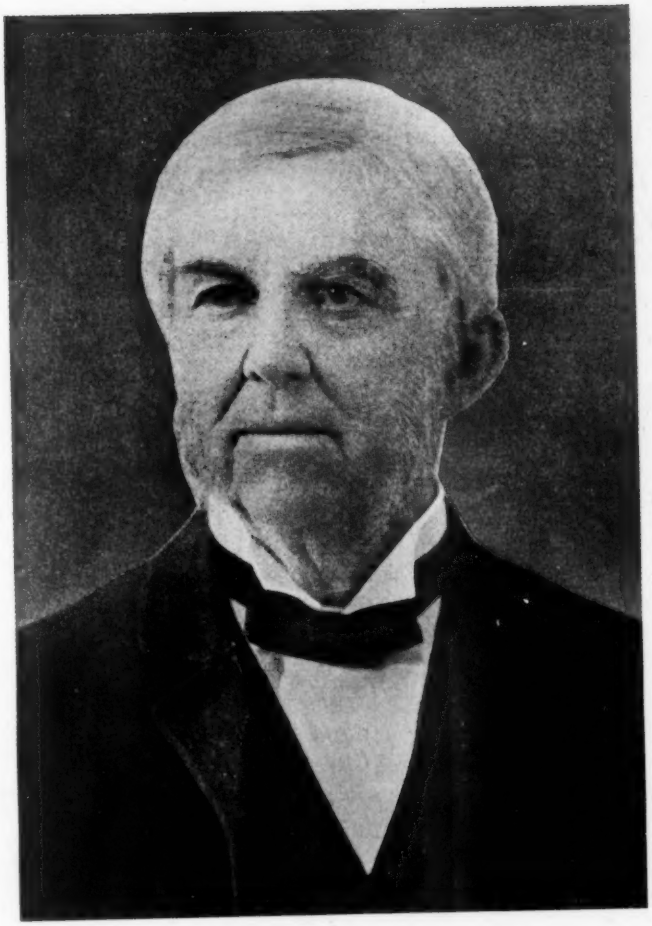

OLIVER WENDELL HOLMES

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A Plea for a Routine X-Ray Examination of the Gallbladder Region in Every Chronic Abdomen

B. R. KIRKLIN, M. D.
Muncie, Indiana.

I SHALL attempt to show, in the brief time allotted, that the competent roentgenologist can be of invaluable assistance in eliminating or sustaining a diagnosis of gallbladder pathology in practically every chronic abdomen.

Much has been written in the last few years concerning the value of the roentgen study of the gallbladder and a varied array of statistics and opinions has resulted. Some men report that the roentgen methods can only show a very low percentage (as low as ten per cent) of gall stones and that negative roentgen findings mean nothing, while other men claim that in their hands the roentgen methods will show from 85 to 95 per cent of pathological gallbladders. George states that the roentgen methods of diagnosing pathology in the gallbladder have become so accurate that if there be no direct roentgen evidence of gall stones, or indirect evidence of adhesions involving the stomach, duodenum or colon, as a result of cholecystitis, the surgeon should have a preponderance of clinical evidence as a warrant in operating for gallbladder pathology.

Gall Stones

It has only been in the last few years that gall stones could be detected by the roentgenologist to any extent and for that reason most roentgenologists did not recommend roentgen ray examinations and only made them when urged to do so. Fortunately, however, men like George, Case, L. G. Cole and others, found that gall stones containing calcium could be detected much more frequently than they had suspected, which fact stimulated the search. While as yet few roentgenologists have published their reports, the general opinion among several roentgenologists is, I believe, that from 60 to 90 per cent of gall stones will show.

It is considered impossible to demonstrate a pure cholesterine stone on the x-ray plate or film; but it is probably safe to say that a pure cholesterine stone rarely,

if ever, exists. The dense calcareous gall stones are very easily demonstrated by most any technique used, but this type of gall stone is in the minority. This fact may account for the reason why the study of gallbladder by roentgen methods has made so little progress. By far the greater number of gall stones consist of a cholesterine center with a calcareous periphery. If the calcareous layer is thin, which is true in about 50 per cent of the cases, the stones are more difficut to detect.

Gallbladder Disease With or Without Stones.

In the past and even at the present time too many roentgenologists only search for gall stones, instead of searching carefully for any direct or indirect evidence of gallbladder pathology other than the mere presence of stones. And furthermore, the gallbladder region is usually examined by a great many roentgenologists only when the referring physician requests such an examination, which is in a very small percentage of cases referred; for the great majority of physicians are of the opinion that roentgen methods are of no value in gallbladder pathology. Even a great many roentgenologists are still of the opinion that they are wasting time and material in searching for gallbladder pathology and when they do go after a gallbladder they do it in a half-hearted way, doubting if they will find any pathology even though it be there. Unless a man attempts this work carefully and believes in its merits and is confident that his investigation is thorough, he had better not try it. We think that the reason some men still have no faith in the roentgen ray methods is because they are not developing a careful technique and are only finding the dense calcareous gall stones instead of making a careful systematic search for any pathology of the gallbladder with or without stones in every case that is referred for an abdominal study. We feel quite confident that if every competent roentgenologist will make a careful routine search for gallbladder pathology in every one of his gastro-intestinal and other abdominal studies, that the statistics reported so far will soon be more generally accepted and probably improved upon.

We not only attempt to demonstrate gall stones, for they are usually of secondary importance, but also attempt to demonstrate any pathology of the gallbladder, with or without stones. We should be able by the density of the gallbladder shadow to detect thickened or enlarged gallbladder, filled with small stones or bile of very high specific gravity and by giving the patient a barium meal we should be able to demonstrate a cholecystitis with adhesions and also frequently outline the pressure of an enlarged

gallbladder against the stomach, duodenum or colon.

Technique.

Time will not permit going into any elaborate details concerning our technique. The referring physician is instructed to give every patient the following instructions, if time permits: Take two drachms of compound licorice powders at bedtime each night for three or four nights previous to the examination and eat no supper the day previous and no breakfast on the morning of examination. We first make from three to six exposures of the gallbladder region (including area between crest of ileum and tenth rib), varying the penetration, time, etc.; but being careful that the darkroom assistant develops all the plates or films for the same length of time thereby insuring plates of varying densities. The above preparation and examination is made on every patient that is examined for any abdominal condition. We then give a barium meal in the fluoroscopic room and search carefully with the fluoroscopic screen for any indirect signs, which are enumerated later on. We then make from three to six more gallbladder exposures in order to pick up any adhesions or pressure involving the stomach and duodenum, or any other findings that might have been missed on our first series of gallbladder plates. The region of the hepatic flexure of the colon is studied at twenty-four hours.

A good gallbladder plate or film should show a wealth of detail of soft structures and one of the most important factors is the absolute stillness of the patient during the exposure. We invariably carefully drill the patient before starting the exposures. The Bucky-Potter diaphragm should be a very valuable asset in this work and will undoubtedly make possible the obtaining of plates of still finer quality than before.

We attempt to impress the referring physician that we also need his clinical help and I think that we, as roentgenologists should consider ourselves as consultants and require when possible a complete clinical history of every case. If such a history does not accompany our patients we take a history in the course of our examination, so that this may be consulted as well as our x-ray findings in arriving at our final conclusions

Interpretation.

Any shadow on the x-ray plate or film which we interpret as a gallbladder shadow represents in our opinion, a pathological gallbladder and is so reported.

Even if no suspicious gallbladder or gall stone shadows are present, a number of roentgen ray findings following a barium meal are of invaluable assistance in the roentgen diagnosis of pathological gallbladder, with or without stones, namely:

1. Hepata-fixation of the stomach, the pyloric region being

drawn to the right and upward in a significant manner.

2. Characteristic deformity of first portion of duodenum and possibly the second portion due to adhesions pulling the duodenum to the right and outlining the gallbladder.

3. Outlining of enlarged gallbladder due to pressure against duodenum or antrum of the stomach.

4. A definite small area of pain to pressure accurately localized to the outer side of the shadow of the duodenum, usually accompanied by a lag in the emptying of the duodenum.

5. The pressure of Riedel's lobe of the liver, when demonstrable following gas distention of the stomach and colon, is another contributory sign of gallbladder disease, in which jaundice is not present.

6. The emptying time of the stomach following a barium meal is usually much shortened, and the outline of the duodenum is well seen owing to a delay in the emptying time of the duodenum, or to a too rapid out-pouring of the stomach-contents through the duodenum. It was formerly supposed that this unusual visibility of the duodenum strongly suggested duodenal ulcer, but Case states that in his experience, it may occur in any duodenal affection or in gallbladder disease.

Time will not allow taking up differential diagnosis.

Surgical Investigation

It quite often happens that the roentgenologist will report gallbladder pathology with or without stones, only to have the surgeon inform him that he palpated the gallbladder at operation and found it normal. We wish to say here that we do not believe that the roentgen ray or any other evidence of gallbladder pathology should be considered wrong until the accused gallbladder is at least opened or better still, has been removed and submitted to a histological examination, for is it not a fact that it is impossible for the average surgeon to determine by palpation alone, if the gallbladder is normal? We believe that it has been definitely proven that it is. Dodd reported a case from the Massachusetts General Hospital where both the surgeon at operation and the pathologist at postmortem failed to palpate the stones which were later found in the distended bladder.

Statistics

During the past 18 months we have examined 421 patients in which we have made a complete roentgenological study of the gallbladder. We reported gallbladder pathology, with or without stones in 168 cases or in approximately forty per cent of the cases studied. It should be borne in mind that the gallbladder pathology was suspected by the clinician in less than ten per cent of the 421 cases. We have been able to obtain the op-

erative findings found in 128 of these cases. In these 128 cases the roentgen conclusions were not confirmed in only nine cases so that in this small series our conclusions were correct in approximately 92 per cent of the cases operated. In four of the nine failures the surgeon reported that the gallbladder was normal to palpation, the other five were unquestionably errors in our interpretation of our roentgen findings. We also realize that this is a small series and that as it grows the percentage of failures may increase.

Conclusions.

1. We are not justified today in making the diagnosis of "Gallbladder Pathology" without having taken advantage of all the methods at our disposal which can throw light on the diagnosis, including a roentgen study. This was excusable a few years ago when a man had to depend largely upon his own ability to do everything. But now there are very few medical centers of any size that do not have a trained and competent roentgenologist—and we must insist that he be competent, for if he is not, the use of the roentgen ray will do more harm than good in this work as well as all other branches of roentgenology, by the incompetent man arriving at the wrong conclusions.

2. As in all other branches of diagnostic roentgenology, the most important factor in this work is the correct interpretation of the various shadows as seen upon our x-ray plates and screens.

3. The roentgen methods must be more thorough and plates must be used freely.

4. It is our opinion that by the skillful use of the roentgen methods alone, in the proper hands, it is possible to detect from 80 to 95 per cent of all pathological gallbladders.

5. We do not think it is fair to condemn the use of the roentgen methods just because every man who possesses an x-ray machine is not able to show gall stones or gallbladder pathology, as it might be the man, and not the x-ray that is at fault.

6. The roentgen methods of detecting gallbladder pathology are so valuable that a very careful routine roentgen examination of the gallbladder of every chronic abdomen should be made.

Case Reports

Case No. 1194.

Female, age 57 years.

Roentgen Conclusions.

Large pendulous gallbladder with stone in cystic duct and at least nine small stones free in gallbladder. Pathological appendix. Operated by Dr. C. M. Mix, Muncie, Indiana.

Operative Findings.

Roentgen conclusions confirmed. Ten gall stones were found, as described above.

Case No. 1416.

Male, age 36 years.

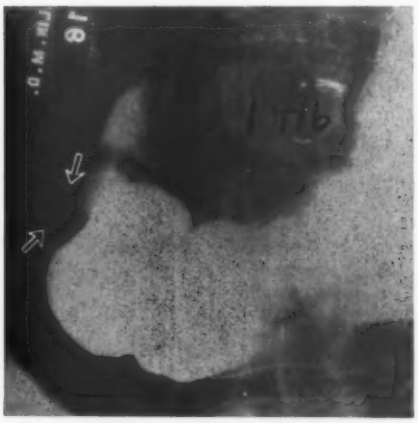
Roentgen Conclusions.

Distended gallbladder with large gall stone. Adherent appendix. Unquestionably a surgical abdomen. Operated by Dr. Ed Clark, Indianapolis, Ind.

Case No. 1194—Upper shadow is stone in cystic duct; nine shadows represent nine gall stones found in fundus of gallbladder; below is seen the shadow of a pathological adherent appendix.

Operative Findings.

Large, thickened gallbladder with stone corresponding in size to one seen by roentgen examination. Five small gall stones. Densely, adherent appendix. The five small gall stones can be seen on x-ray plates, but were overlooked before the operation.



Case No. 1416—One large gall stone is shown, also five smaller ones, immediately to right of large one. Note pressure of gallbladder against pylorus.

Case No. 1074—Pathological gallbladder filled with gall stones. Pathological appendix.

Case No. 1074.

Female, aged 31 years.

Roentgen Conclusions.

Pathological gallbladder filled with gall stones and a pathological appendix. Operated by Dr. C. M. Mix.

Case No. 1299—Note the shadow cast by gallbladder filled with small stones.

Case No. 3415—Large, distended gallbladder filled with very dense stones.

Operative Findings.

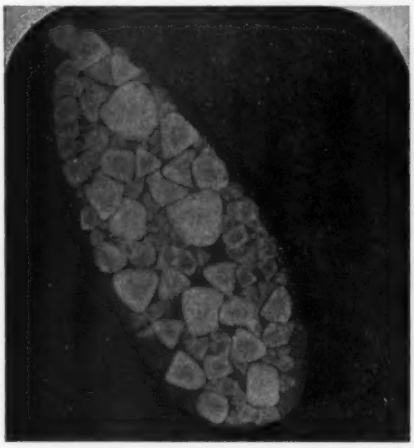
Gallbladder thickened. Sixteen gall stones, size of ordinary dice. Bulbous, obliterated appendix.

Case No. 1299.

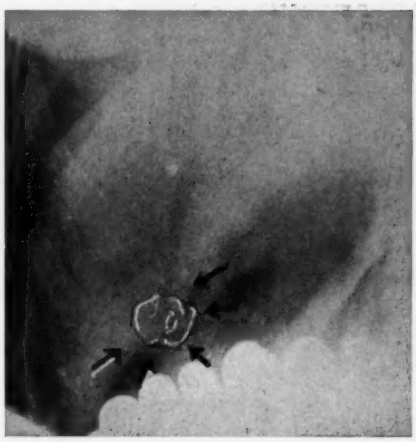
Female, age 40 years.

Roentgen Conclusions.

Pathological gallbladder with probable gall stones. Pathological appendix. Operated by Dr. C. M. Mix.



Case No. 3415—Roentgenogram of gallbladder after its removal.



Case No. 3311—Showing gallbladder and large gall stone.

Operative Findings.

Large, thickened gallbladder filled with very small stones. Large, adherent appendix.

Case No. 3415.

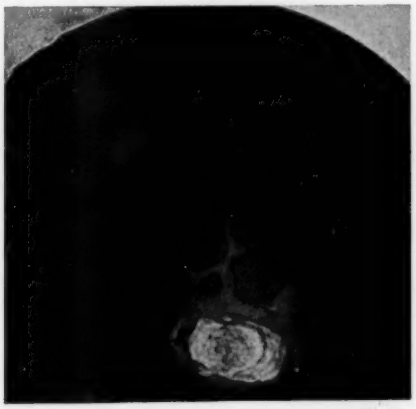
Female, age 58 years.

Roentgen Conclusions.

Pathological gallbladder filled with very dense gall stones. Liver and gallbladder quite low. Pathological, adherent appendix. Operated by Dr. W. C. Moore.

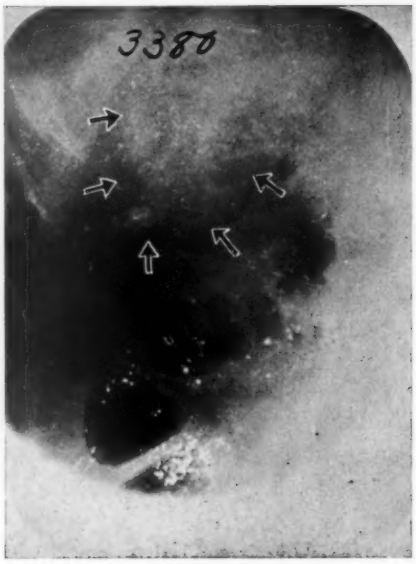
Operative Findings.

Roentgen findings confirmed.



Case No. 3311—Roentgenogram of removed gallbladder, showing one gall stone, which casts a positive shadow, and seven which cast negative shadows.

Case No. 3419—Visualized, distended gallbladder.



Case No. 3380—Visualized, distended gallbladder, but no gall stone shadows seen.

Case No. 3311.

Female, age 55 years.

Roentgen Conclusions.

Pathological, enlarged gallbladder with stone. Operated by Dr. C. M. Mix.

Operative Findings.

Thickened gallbladder with eight gall stones, seven of which gave negative shadows. (See illustration.)

Case No. 3419.

Female, age 34 years.

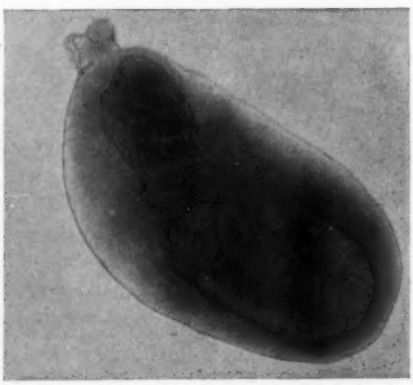
Roentgen Conclusions.

Pathological distended gallbladder, with or without stones. Operated by Dr. Will C. Moore.

Operative Findings.

Empyema of gallbladder, no stones.

Case No. 3419—Roentgenogram of gallbladder after its removal.



Case No. 3380—Roentgenogram of gallbladder after its removal, showing two large gallstones which did not show on roentgen examination. Part of one casts a negative shadow. This case illustrates the importance of examining plates and films for gallbladder shadows rather than for gall stone shadows.

Case No. 3451—Visualized, distended gallbladder.

Case No. 3380.

Female, age 47 years.

Roentgen Conclusions.

Pathological gallbladder with or without stones. Operated by Dr. Will C. Moore.

Operative Findings.

Thickened gallbladder containing two large stones. One stone cast a negative shadow. (See illustration.)

Case No. 3099—Showing gallbladder with stone.

Case No. 2794—Two large, dense calcareous gall stones.

Case No. 3451.

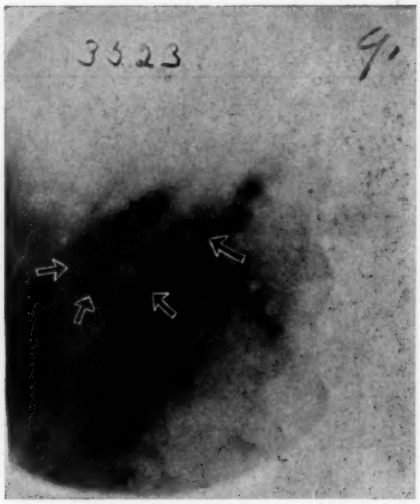
Female, age 20 years.

Roentgen Conclusions.

Distended gallbladder with or without stones. Pathological appendix. Operated by Dr. E. H. Clauser.

Operative Findings.

Distended gallbladder, no stones. Chronic adherent appendix.



Case No. 3523—Visualized, distended gallbladder.

Case No. 2408—Pathological gallbladder with a large gall stone.

Case No. 3099.

Female, age 54 years.

Roentgen Conclusions.

Pathological gallbladder with stone. Operated by her brother, Dr. Tom Noble, Indianapolis, Ind.

Operative Findings.

Thickened gallbladder with large stone.

Case No. 1964—Pathological, adherent gallbladder filled with stones. Pathological, adherent appendix.

Case No. 2794.

Female, age 57 years.

Roentgen Conclusions.

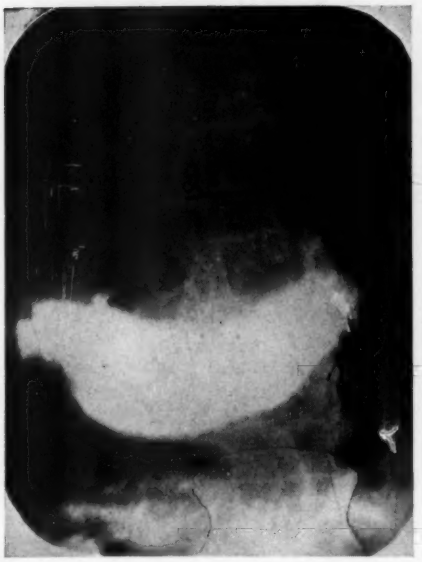
Two large gall stones. Operated by Dr. C. M. Mix.

Operative Findings.

Two large gall stones.

Case No. 2899—Visualized, pathological gallbladder.

Case No. 1883—Not distinct, owing to fact that patient moved.



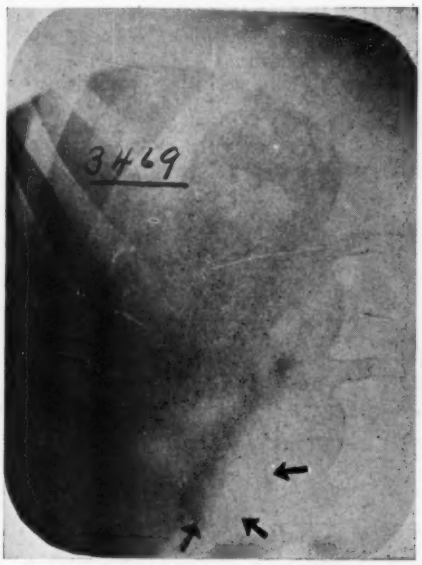
Case No. 2808—Note deformity of pylorus due to gallbladder adhesions.

Case No. 3523.

Female, aged 42 years.

Roentgen Conclusions.

Pathological, distended gallbladder with or without stones. Operated by Dr. E. H. Clauser.



Case No. 3469—Visualized, distended gallbladder. Note extremely low position of liver and gallbladder.

Case No. 3468—Visualized, pathological gallbladder.

Operative Findings.

Empyema of gallbladder, no stones.

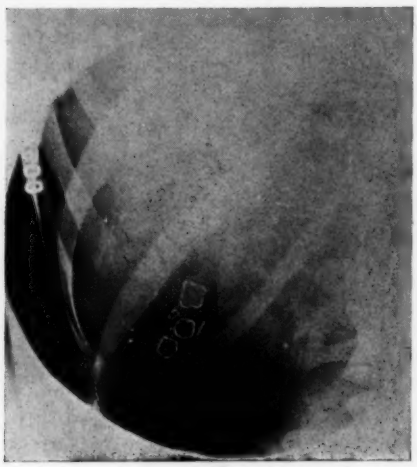
Case No. 2408.

Female, aged 40 years.

No gallbladder symptoms or history.

Roentgen Conclusions.

Pathological gallbladder with a large gall stone.



Case No. 2203—Pathological adherent gallbladder with stones. Pathological appendix.

Operative Findings.

Not operated yet.

This case was referred to us for roentgen examination of left kidney as surgeon suspected pathology in that region. Illustrating value of routine examination of gallbladder.

Case No. 2899.

Male, age 40 years.

Roentgen Conclusions.

Pathological gallbladder, with or without stones. Operated by Dr. G. R. Andrews.

Operative Findings.

Thickened gallbladder filled with heavy bile. No stones.

Case No. 1964.

Female, age 45 years.

Roentgen Conclusions.

Pathological, adherent gallbladder filled with stones. Pathological, adherent appendix. Operated by Dr. G. R. Andrews, Muncie, Indiana.

Operative Findings.

Densely adherent gallbladder which contained 32 sharp-edged stones. One stone in duct. Appendix densely adherent.

Case No. 1883.

Female ,aged 57 years.

Roentgen Conclusions.

Pathological gallbladder filled with gall stones. Operated by Dr. C. M. Mix.

Operative Findings.

Thickened gallbladder containing many small stones.

Case No. 2203.

Female, age 27 years.

Roentgen Conclusions.

Pathological adherent gallbladder with stones. Pathological appendix. Operated by Dr. E. H. Clauser, Muncie, Indiana.

Operative Findings.

Densely adherent gallbladder, which contained two stones one cm in diameter and several smaller stones. Appendix not explored.

Case No. 2808.

Female, age 47 years.

Roentgen Conclusions.

Pathological gallbladder with extensive adhesions involving the pylorus and duodenum. Operated by Dr. Will C. Moore, Muncie, Indiana.

Operative Findings.

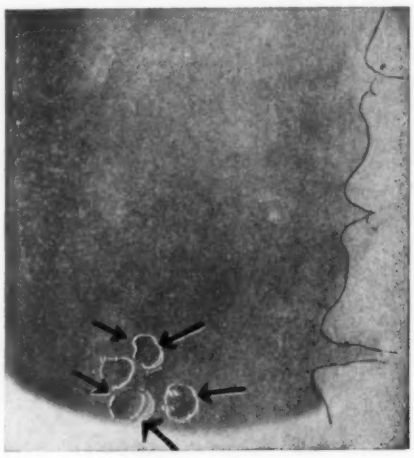
Thickened gallbladder surrounded with dense adhesions involving liver, pylorus and duodenum.

Case No. 3469.

Male, age 43 years.

Roentgen Conclusions.

Pathological, distended gallbladder with or without stones. Liver and gallbladder quite low. Pathological cecum and appendix. Operated by Dr. Hebert Sperry, Muncie, Indiana.



Case No. 1814—Showing four gall stones.

Operative Findings.

Elongated gallbladder. Jacksonian membrane enveloping cecum and appendix.

Case No. 3468.

Male, age 38 years.

Roentgen Conclusions.

Pathological gallbladder with or without stones. Pathological appendix. Operated by Dr. A. W. Adson at Mayo Clinic.

Case No. 2746—Showing two gall stones.

Operative Findings.

Definitely pathological gallbladder, no stones. Chronic, pathological appendix.

Case No. 1814.

Female, age 68 years.

This case had been diagnosed and treated for "Hypochlorhydria" in two large medical centers. Roentgen study of gallbladder had not been made previously. All symptoms were gastric.

Roentgen Conclusions.

Pathological, elongated gallbladder with gall stones. Chronic, inactive, pulmonary tuberculosis.

Operative Findings.

Not operated due to pulmonary findings and age.

Case No. 2746.

Female, age 33 years.

Roentgen Conclusions.

Pathological gallbladder with stones.

Operative Findings.

Large pendulous gallbladder with four gall stones.

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*Read at Annual Meeting of the Radiological Society of North America. Chicago, December, 1920.

A Comparison of Important Factors in the Diagnosis of Gastric and Duodenal Ulcer

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Introduction

THIS study is undertaken with the object of reviewing the essential factors in the diagnosis of gastric and duodenal ulcer as we have found them in our clinic. It begins with a detailed tabulation of all the cases in which the diagnosis of gastric or duodenal ulcer has been made, followed by a more detailed study of the operated cases, as well as those operated in which the roentgen examination has been a factor in making the diagnosis. It includes in all 204 cases which have been examined during the last five years.

Local conditions may affect our run of cases. In particular, working with surgeons and internists having different conceptions of treatment alters the ratio of operated cases to surgical cases. A great number of patients have themselves refused the surgical care of their ulcers. But in the main this will show that a detailed study of the patients has increased the accuracy of diagnosis, and the roentgen examination as a routine has been the greatest factor, after the careful consideration of the history in the case, in giving to the clinician exact information.

The place of the roentgen examination is already accepted. This is not meant for a defense of this newest method in gastroenterology, but an effort to further illustrate the value of its correlation.

General Discussion

Case records of gastric ulcers go back to the tenth century, but Cruveilhier, in the early part of the nineteenth century, first gave it a clear description. English and American surgeons, in developing the surgery of the upper abdomen, have been the means of stimulating the wonderful advance of recent years in the diagnosis of gastric and duodenal ulcers. Statistics are quite valueless to determine the exact numbers occurring among the civilian population. Autopsy reports clearly indicate that vast numbers are unrecognized, and herein lies a fertile field for further study. A record of 59,000 autopsies shows an incident of over four per cent.

It is a disease that belongs to the third decade in life, usually unrecognized until the fourth. The ratio of sexes shows that one female to three males is afflicted. A few years ago this was reversed Especially in the occurrence of duodenal ulcers is the male sex predominant. The classical expectancy has been that 20 per cent will be diagnosed clinically and

the remainder at the operating table. Careful study of the 75 per cent diagnosed by the surgeon has reduced this number to less than ten per cent.

This is still the transition stage from older methods to the new. Some are discarding the stomach tube entirely, some relying on only the roentgen method, and some still plot beautiful curves of secretory function which only a physiologist knows much about. A careful diagnostician may make a high number of accurate diagnoses playing to any one method. A more sane view is to correlate all the essential diagnostic points, keeping in mind that some are speaking in terms of large currency and others in coins of small value. The stomach tube and blood tests are still essential, though they may have lost their relative value in the final diagnosis.

Moynihan did much in calling our attention to the value of the history. Though he said it, he hardly meant to infer that the diagnosis could be made by correspondence. The more careful the analysis, the more clearly is this truth established. Every ulcer case history contains a syndrome of ulcer. Routine laboratory tests are secondary, even though essential. They tell more of the secretory function, which information is of greater value in the treatment. The determination of motor function is more important. This the roentgen examination shows with greater ease and accuracy. Besides, it usually reveals the anatomical defect of an ulcer and then locates accurately the lesion in the duodenum or the stomach. Without this, the choice and course of medical and surgical treatment is blindly made and empirically followed.

Textbooks devote a considerable space to etiology, giving trauma, thrombosis and chemical theories undue prominence. The infectious theory has assumed rightfully and easily the preference, as shown by animal experimentation, the presence of foci of infection elsewhere in the body, and the finding of streptococci in the ulcer tissue.

History.

Eusterman, in the analysis of 2,400 cases, found that gastric ulcers occurred twice as frequently in the male as the female. The average age of the patient with the gastric ulcer was 47. The patient with the duodenal ulcer came for study four years earlier.

Symptoms divide easily into those of primary and those of secondary importance. Of greatest value is the history of pain. This pain occurs periodically and gives rise to chronic distress with free intervals. At first the attacks are in the spring and fall and the periods are short. Every attack is clear-cut and always the same, lasting from four to six weeks. The pain is in the epigastrium to the right of the center. Hunger pain is characteristic and usually corresponds to the painful area.

The nearer the pylorus, the shorter the period after eating before it begins. In the majority of duodenal ulcers the time elapsing between intake of food and the beginning of pain is three to four hours; in the majority of the gastric ulcers the time is only one-half to two hours. Soda, food, posture or vomiting give relief. There may be a fear to eat, though the desire is strong. General abdominal distress, if present, is often relieved by defecation and belching.

The secondary symptoms of gas eructation, constipation and vomiting are mostly the results of disturbed motility. Vomiting of blood is important, but not the rule. Tarry stools observed by the patient seldom prove to be evidence of value. Nocturnal pain occurs only in two per cent of the cases. Gastric ulcer symptoms are like duodenal. In general they are less severe; and, on each point compared, less sharply defined and hence less accurate. Without further confirmation, it is unsafe to make a positive statement as to location on the basis of the history alone. Yet an accurate history is the key to the study of all cases. It still remains the most reliable means of diagnosing ulcer, and is one from which a provisional diagnosis can usually be made.

Physical Findings

Positive physical findings follow the history fairly well. But they are less distinct, less characteristic, and hence not very important when taken alone. The tender point in a sensitive epigastrium, generally over the painful area, speaks for the peritoneum made sensitive by the presence of ulcer inflammation. It is definite, localized, and constant. It differs in nature from the tenderness of the gallbladder, which is more to the right and under the costal arch. Muscle rigidity, if present, is slight. Rarely can an ulcer be palpated. Visible peristalsis means obstruction. A palpable gastric mass nearly always means malignancy. There is slight tenderness all over the abdomen at the crisis of motor activity. Outlining of the stomach margin is inaccurate. Inflation gives but little idea of the actual size. The intestines hide the stomach. Obstruction is best told by other means.

Perforation and its signs do not belong in this discussion.

The physical examination should be complete to rule out tuberculosis, chronic nephritis, tabes and other diseases with gastric symptoms. Also it should include a comprehensive survey of all possible fields where foci of infection might be located.

The Clinical Laboratory Findings

The gastric analysis is essential, though its importance is not primary. All the evidence obtained from it may be classified as (1) Motor; (2) Secretory, and (3) Blood. The Ewald test meal is now standard and allows of general comparison, thanks to the widespread adoption.

The most valuable information concerns the motor activity, and it usually conforms to the ulcer syndrome in the history. Gastric distress from ulcer reveals increased peristalsis and muscle activity in the stomach wall. Obstruction, just as well as the usual increase in gastric unrest, can be studied better with the barium meal.

The curves obtained from the frequent withdrawal of gastric contents by the Rehfus tube are valuable in determining the secretory function. By a graphic representation of a full gastric cycle, much more can be told than by a cross-section of the curve which a single examination tells. In two-thirds of the cases with hperacidity, ulcer will be the cause. The remaining one-third will be secondary to gallbladder or appendix. Higher curves, running above 80 and even to 100, may be entirely normal. But a high acidity, or even a low one, in the final analysis may be the turning point in the diagnosis. Unusual and striking extremes in high acidity are more characteristic of duodenal than of gastric ulcer.

Actual bleeding from gastric or duodenal ulcer is easily told. Blood is nearly always present in traces in the chemical analyses of gastric contents or feces. Chronic ulcers do not often bleed. To be of value, blood should be in the feces and stomach contents in definite quantities and constantly present on repeated examinations; and then, the test positive generally means carcinoma and not ulcer. Tests for occult blood are of little value in the routine examination of ulcer.

The Roentgen Findings

There is no intention to discuss roentgen technique. Only general mention can be made of the value of this method as compared with the others. A few years have seen the roentgen examination develop into a valuable and exact science. Everyone should have a knowledge of roentgenograms and understand fluoroscopy of the alimentary canal. So intimately connected are the technique and interpretation that the special work must be left to the hands of a roentgenologist. The study of the gastro-intestinal tract has not been a popular one even with those who work daily with the roentgen ray. This is due largely to the lack of correlation between the internist and the roentgen worker. In no field is there greater need for the careful collaboration of history, physical findings, chemical analysis and roentgen study. Yet in private practice and in the larger clinics each one is often worked out so nearly alone that the pleasure and exactness of co-operation is lost.

The normal stomach must be kept clearly in mind. This varies just as much as people are tall and thin, short and fat, or flabby and muscularly developed. The findings, if positive, are generally definite and quickly seen. The acute-

ness of observation is lost by prolonged study.

Roentgenograms are important as set stages of different phases of form and motor activity. The fluoroscope is essential to connect these phases and the living activity of normal or pathological changes. It also permits, in keeping with cleverness and knowledge of technique, a study of things never seen on plates. The two must be used as complements of each other.

Roentgen interpretations often fail, as do all other clinical tests. Seldom are conditions seen like the clear textbook illustrations. The patient may be fat or cranky or the plates poor. Technique influences very much the value of the evidence. The human element enters in to an enormous degree. Obtaining the information is a part of the art in examination, and often it taxes heavily the ingenuity and the intelligence of the worker.

The cardinal points in the gastric examination may be summarized as defects in contour of the luminal outline expressed in the following descriptive terms: Filling defects, projections, niches, diverticula, hourglass deformity and spasms. Ulcer changes are easily seen on the greater and lesser curvatures. It is difficult to demonstrate them on the posterior wall. Fortunately 90 per cent are found in the positions easy to locate. The same is true with duodenal ulcers. Ninety per cent are found in the first one and one-half inches of the duodenum. There are also indirect signs of gastric and duodenal ulcers. These serve to give the impression that ulcer is present, but more exacting study demands that the actual ulcer be demonstrated by tissue change. Obstruction often seen is due to actual tissue contraction in less than ten per cent of the cases (C. H. Mayo).

Every patient with an ulcer should be studied at least once a year, whether the treatment has been medical or surgical. Ulcers should be re-examined for changes. No patient should be subjected to an exploratory operation until a complete examination has been made. Often the operation will be unnecessary. A negative diagnosis of ulcer is a most convincing argument that none is present. By no other means is it possible to locate with exactness the ulcer in the stomach or the duodenum. Other problems of surgical attack may be consistently worked out. An ulcer larger than a quarter situated in the stomach is potentially malignant, for 60 per cent of these have been proven to be cancer (Mayo). Barring extreme ptsosis with flabby stomach walls, a residue at the end of six hours usually means pathology, and if the search is rigidly maintained the reward is rather certain. Gastric ulcers, so far as pathonomic signs are concerned, may disappear under treatment, and this doubtless means healing; but chronic indurated ulcers of the

duodenum never disappear. Gastroenterostomy generally renders demonstration of the deformity difficult if not impossible.

When should the roentgen examination be made? It should be the routine when any serious disease of the gastro-intestinal canal is suspected, in all patients in the cancer age who have any suspicions of carcinoma, in all long-standing gastric disturbances which have not yielded to treatment, and in neurotics to encourage their treatment. It should replace the exploratory operation so far as possible.

Summary

1. A careful history should precede all study of any gastro-intestinal lesion. A history is present, even though not diagnostic, in 90 per cent of all ulcers.

2. The physical findings follow constantly a positive history. While less valuable, they add to the weight of evidence.

3. Clinical laboratory results are the weakest of all, but if characteristic they may turn the tables toward an exact diagnosis.

4. The roentgen findings are the most exact of all, but do not in any sense supersede the history.

5. The careful correlation of history, physical findings, clinical laboratory results and roentgen evidence has raised the percentage of accuracy from about one-third to nearly one hundred per cent.

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TABLE NO. I-A—GASTRIC ULCERS

KEY TO LETTERING

M—Male.
F—Female.
P—Positive.
N—Negative.
G—Gastric.
D—Duodenal.
D—Doubtful, in Table I (A and B)
Q—Doubtful, in Subsequent Tables.

Patient's Name	Number	Sex	Diagnosis...	History.....	Physical Findings....	Clinical Findings....	Roentgen Findings....	Fractional ..	Operative Findings
1—N C B	A-2750	M	G	P	P	N			D. U. Chr. App.
2—M E	A-2948	F	G	P	N	N	P		
3—G G	A-3138	M	G	P	P		P		Perigastric Adh.
4—E J S	A-3302	M	G	P	P	P		Yes	
5—F M M	A-3735	M	G	P	N	P	D P	Yes	
6—F M	A-4004	M	G	P	P				A. C. Perf. G. U.
7—B B A	A-4646	F	G	P	P				
8—B C	A-4738	F	G	P	P				G. U. and G. B.
9—G E	A-4795	M	G	P		P		Yes	G. U. Death
10—N G	A-4842	F	G	P	P		D P		
11—M E P	A-5056	M	G	P	P	P	P		
12—Mrs. R	A-5086	F	G	P	P		P		G. U.
13—E S S	A-5107	F	G	P					
14—F W M	A-3396	M	G	P	P		D P		
15—R B W	A-5176	M	G	P	P				
16—C B	A-4698	M	G	P	P				
17—M I	A-4878	F	G	P	P	N	P	Yes	Chr. Appendicitis
18—J H G	A-4830	M	G	P	P				Perforated—G. U.
19—F J	A-4909	M	G	N	N				Perforated—D. U.
20—W H Y Y	A-507	M	G	P	P				
21—S M	A-546	M	G	P	P				
22—Mr. P	A-572	M	G	N	P				Perforated G. U. (Death)
23—B A	A-575	F	G	P	D				
24—Miss B	A-576	F	G	P	P	P	P		
25—A K	A-587	M	G	P	D				
26—E D	A-599	F	G	P	P				
27—Mr. A	A-601	F	G	P	P	N	P		
28—H S	A-1246	M	G	P	D				
29—T N E	A-1875	M	G	P	D	N			
30—W P B	A-566	M	G	P	P		P		Gastric Ulcer
31—L D	A-2793	M	G	P	D				
32—L P	A-3723	M	G	P	P				Perf. G. U. Death
33—F D	A-3833	M	G	P	P	D	P	Yes	
34—J A K	A-3963	M	G	D	D				
35—G S	A-4093	M	G	P	P				
36—W M C	A-4369	M	G	P	P	N	P		
37—O A H	A-4872	M	G	D	N				
38—A K	A-4928	M	G	P	N		P		Gastric Ulcer
39—C C M	A-5006	M	G	P	D				
40—J H	A-5446	M	G	P	P				
41—W E N	A-5423	M	G	P	P	D	D P	Yes	
42—D R C	A-5407	M	G	P	P	P	P	Yes	
43—A J R	A-5281	M	G	P	P				
44—W T V	A-5915	M	G	N	P	D	P	Yes	
45—Mrs. M	A-4946	F	G	P					
46—G R	A-2037	F	G	P	P				
47—O N	A-5015	F	G	D	D				
48—F P	A-5031	M	G	P	D	P	D	Yes	
49—C B	A-577	M	G	P	D				
50—J D M	A-3381	M	G	D	P	N	N		Perigastric Adhns.
51—T O T	A-3995	F	G						Gastric Ulcer
52—S B R	A-5688	F	G	D	P	P	D	Yes	
53—E H G	A-133	F	G	P	P				
54—P J	A-282	F	G	P	D				
55—G D	A-6031	F	G	P	N				
56—F M B	A-6013	F	G	P	P	N	D	Yes	
57—A H	A-6080	F	G	P	P	N	P	Yes	
58—D S	A-6119	M	G	P	N	P	P	Yes	
59—J E	A-6219	M	G	P	P	P	P	Yes	

TABLE NO. I-B—DUODENAL ULCERS

Patient's Name	Number	Sex	Diagnosis...	History.....	Physical Findings....	Clinical Findings....	Roentgen Findings....	Fractional ..	Operative Findings
1—D A B	A-3651	M	D	D			N		
2—A I	A-4512	M	D	P	N		N		
3—B E C	A-4757	M	D	D	N	N		Yes	
4—G N	A-4981	F	D	D	N		P		
5—G P	A-5071	M	D	P	N		P		
6—M R	A-5089	F	D	D	D				
7—J M H	A-5832	M	D	N	N	P	P	Yes	
8—R L P	A-5295	M	D	P		N	P		
9—W R	A-5432	F	D	P	D	N	N	Yes	
10—E G W	A-5478	M	D	P	N		P		
11—C F	A-5482	M	D	P	P	N	D	Yes	Gall Bladder
12—J B	A-5765	M	D	P	P	P	P	Yes	
13—A E B	A-5766	F	D	D	D	N	P	Yes	
14—Mrs. B	A-5778	F	D	D	P	N	G P	Yes	
15—G C	A-5793	F	D	P	P	P	P		
16—R A H	A-5833	M	D	P	N	P	P	Yes	
17—C E H	A-5834	M	D	P	N	P	P	Yes	
18—F C	A-1882	F	D	P	N	N	P	Yes	
19—R L M	A-5872	M	D	P	P	P	P	Yes	
20—L N	A-4882	F	D	D	P		P		
21—A F G	A-148	M	D	P	P	N	P		
22—C S	A-161	F	D	D	P	N	P		Chronic Appendicitis
23—Mrs. S	A-171	F	D	P	N				
24—J P A	A-19	M	D	P	P	N	P		⎧ No Opn. Death later.
25—W E S	A-203	M	D	D	P	P			⎩ Perforated D. Ulcer
26—F A T	A-232	M	D	P	N				
27—F H	A-288	F	D	P	P	N			
28—R P	A-358	F	D	D	D	D			
29—C V M	A-381	M	D	P	P				⎧ Chr. Appendicitis
30—H M M	A-398	F	D	P	P				⎩ Pericholecystitis
31—J M C	A-401	F	D	P	P				
32—R B M	A-452	M	D	P	P	N	P		Chr. Ap. D. Peri Bands
33—G E P	A-491	M	D	P	P	N	P		Chr. D. Ulcer
34—Mr. C	A-559	F	D	P	P	N	P		Chr. D. Ulcer
35—Mr. F	A-560	M	D	P	P		P		Chr. D. Ulcer
36—A C	A-561	M	D	P	D				Chr. Ap. Syph.
37—C A P	A-562	M	D	P	P	P	P		Chr. D. Ulcer
38—E M	A-564	M	D	P	P	D	P		Chr. D. Ulcer
39—R T C	A-567	M	D	P	N				Chr. D. Ulcer
40—P B	A-568	M	D	N	D	N			Duodenal Bands
41—F G	A-570	M	D	P	P	N	P		Duod. 2d Portion
42—L D	A-571	M	D	P	N		P		Chr. D. U.
43—J A E	A-574	F	D	P	P		P		
44—H E B	A-578	F	D	P	P				
45—H R C	A-579	M	D	P	P	P	P		
46—E J D	A-580	F	D	P	N				
47—P C K	A-586	M	D	P	P	N			
48—J K	A-588	M	D	P	P	P	P		
49—Mr. J	A-590	M	D	P	D				
50—E H	A-591	F	D	P	P				
51—H H	A-592	M	D	P	P				
52—W G	A-593	M	D	P	P	N	N		
53—C B	A-577	M	D	P	D	N			
54—H F F	A-595	M	D	P	N	N	N		
55—W C D	A-597	M	D	P	D				
56—C L D	A-598	F	D	P	P				
57—C H A	A-600	M	D	P	P	N			
58—S R D	A-603	F	D	P	P	N	P		
59—H W A	A-604	M	D	P	D	P			
60—H S	A-613	F	D	P	P	P	D		
61—H W B	A-648	M	D	P					
62—W A	A-660	M	D	P	P				
63—C H B	A-693	M	D	P	P				
64—G D	A-734	F	D	P	P				
65—C B C	A-696	F	D	P	N	N	P		
66—O B M	A-887	M	D	P	P				⎧ Obstruction Bowels
67—O N M	A-890	M	D	D	D	N	D		⎩ D. U. Chr. Ap. Death
68—J M	A-922	M	D	P		P			
69—G P	A-946	M	D	P	P				
70—E M R	A-977	F	D	P	P	P	P		Chronic D. U.
71—G M S	A-1233	M	D	P	D				Op. ∫ Intestinal Obstr.
72—Mr. B	A-1284	M	D	P	P	P	P		⎩ Death 6 months later
73—Sis. B	A-1288	F	D	P	P	N	P		Duodenal Ulcer

TABLE NO. I-B—DUODENAL ULCERS—(Continued)

Patient's Name	Number	Sex	Diagnosis	History	Physical Findings	Clinical Findings	Roentgen Findings	Fractional	Operative Findings
74—J D	A-1324	F	D	P	P	P	P		D. U. 1914; G. 1910; Op.
75—J K	A-1404	F	D	P	P	P			
76—W H N	A-1447	F	D	P	D	P	N		
77—W C	A-1512	M	D	P	D				
78—C S P	A-1542	F	D	P	P	D			
79—F J S	A-1660	M	D	D	P	P	P		
80—H W Q	A-1704	M	D	P	P	P	P		
81—I W	A-1776	F	D	D	P	N			
82—W T Z	A-1790	M	D	D	P	P	P		
83—P L	A-1935	F	D	P	N				
84—A S	A-1936	M	D	P					
85—F D S	A-1941	M	D	P					
86—B J M	A-1980	M	D	P	P				
87—A W	A-2067	F	D	P	P		P		
88—S W	A-1780	F	D	P	P	N	N		
89—H S	A-2209	F	D	P	P	N	P	Yes	Chronic D. U.
90—J P	A-2239	F	D	P	P		P		
91—K D	A-2247	F	D	P	P		P		
92—C K O	A-2248	M	DG	P	P				Chr. D. & Chr. G. U. Perf.
93—C C O	A-2255	M	D	P	P	N	P	Yes	
94—G E H	A-2374	M	D						
95—L R M	A-2396	F	D	P	P	P	P	Yes	
96—T J P	A-2419	M	D	P	P		P		Elsewhere no report
97—A H R	A-2433	M	D	P	P	N	P		
98—I C M	A-371	M	D	P	P	N	P	Yes	
99—C A H	A-1833	M	D	P	P	P	P		Duodenal Ulcer
100—O W S	A-2456	M	D	P	P	N	P	Yes	
101—F S	A-2458	M	D	P	P	P	P	Yes	
102—F L S	A-2461	F	D	P	P	D	P	Yes	Duodenal Ulcer
103—H S	A-2465	M	D	P	P	N	P		Duodenal Ulcer
104—E E T	A-2492	M	D	P	P	P	P		
105—F H	A-2122	F	D	P	P	N	P	Yes	
106—G U G	A-2953	F	D	P	P				
107—R C E	A-3100	F	D	P	P				
108—W A M	A-4021	F	D	P	P	D	P		
109—A J W	A-2527	M	D	P	P	P	P	Yes	
110—E H J	A-2996	F	D	P	P		P		
111—J W B	A-3049	M	D	P	P	N	D	Yes	
112—E L H	A-3183	M	D	D	P	N		Yes	
113—W W P	A-3210	F	D	P	P	N	D		
114—C B T	A-2483	M	D	P	P	P	P	Yes	Duodenal Ulcer
115—F W J	A-3336	M	D	P	P				
116—A O L	A-3378	M	D	P	P	P	P	Yes	Duodenal Ulcer
117—E S W	A-3428	M	D	P		P		Yes	D. U. 2d portion
118—I R K	A-3533	M	D	N	N	P	P	Yes	
119—H A	A-3650	F	D	P	D				
120—A J R	A-3725	M	D	P	P				
121—A F D	A-3834	M	D	P	P	P	P	Yes	
122—B H	A-3887	F	D	P	P	N	P		
123—L B H	A-3902	M	D	P	N	P	P	Yes	
124—C H H	A-3929	M	D	P	D				
125—Mrs. M	A-4029	F	D	D	P	N			
126—B J M	A-4136	F	D	P	P	P	P	Yes	
127—A W B	A-4674	M	D	P		P	P	Yes	
128—L R	A-4586	M	D	P	P		N	Yes	
129—J R W	A-5214	M	D	P	P	P		Yes	
130—F P	A-5276	F	D	P	P	N	P	Yes	
131—W E R	A-4581	M	D	P	P	P	D	Yes	
132—Rev. E W	A-5338	M	D	P	P	N	P	Yes	
133—S F C	A-6212	M	D	P	P	N	P	Yes	
134—J P H	A-6213	F	D	P	N	P	D	Yes	
135—J K	A-6214	M	D	P	P		P		
136—H K	A-6215	M	D	P	P	N	P	Yes	
137—O R	A-6216	M	D	P	P	P	P	Yes	
138—F H T	A-6217	M	D	D	N		N		
139—W D	A-6218	M	D	P	P	P	P	Yes	
140—H T W	A-6220	M	D	P	P				
141—M Y	A-2221	M	D	D	P		P		Umb. Hernia; Op.
142 M B	A-6019	F	D	P	P				
143—D E	A-6038	F	D	P	P				
144—A C S	A-6129	M	D	P	P		P		D. U. Chr. App.
145—Mrs. T. B.	A-6211	F	D	N	P	N	P	Yes	

TABLE II.—STATISTICAL REVIEW

(Analysis of Table I.)

		Gastric Ulcer	Duodenal Ulcer	Total
A. Total Number of Diagnoses		59	145	204
Total Number of Histories	Positive	50	122	172
	Negative	8	21	29
	Not Given	1	2	3
Total Number of Physical Findings	Positive	37	97	134
	Negative	18	39	57
	Not Given	4	9	13
Total Number of Clinical Findings	Positive	10	38	48
	Negative	12	48	60
	Not Given	37	59	96
Total Number of Roentgen Findings	Positive	21	75	96
	Negative	3	16	19
	Not Given	37	54	89

TABLE III.—STATISTICAL REVIEW

(Analysis of Table I.)

	Gastric Ulcer	Duodenal Ulcer	Total
B. Total number of Operations	15	32	47
Receiving Medical Treatment or Refusing Surgical	44	113	157
Mortality Immediate (per cent)	13	0	1
Total Number of Males	38	92	130
Females	21	53	74
Ratio of Gastric Ulcer to Duodenal	2	5	...
Males to Females	5—3	9—5	7—4

TABLE IV.—OPERATIVE CASES

Patient's Name	Number	Sex	Diagnosis	History	Physical Findings	Clinical Findings	Roentgen Findings	Surgical Report
1—N C B	A-2750	M G		P	P	N	P O	D. U. Chronic Appendicitis
2—G G	A-3138	M G		P	P		P	Perigastric Adhesions
3—F M	A-4004	M G		P	P			Acute Perforated G. U.
4—B C	A-4738	F G		P	P			Gastric Ulcer
5—G E	A-4795	M G		P	N	P		Gastric Ulcer
6—Mrs. R	A-5086	F G		P	P		P	Gastric Ulcer
7—M I	A-4878	F G		P	P	N	P	Chronic Appendicitis
8—J H G	A-4830	M G		P	P			Perforated—G. U.
9—F J	A-4009	M G		N	N			Perforated—G. U.
10—Mr. P	A-572	M G		N	P			Perforated—G. U.
11—W P B	A-566	M G		P	P		P	Gastric Ulcer
12—L P	A-3723	M G		P	P			Perforated—G. U. (D)
13—A K	A-4928	F G		P	N		P	Gastric Ulcer
14—J D M	A-3381	M G		Q	P	N	N	Perigastric Adhesions
15—T O T	A-3995	F G						G. I.
16—C F	A-5482	F D		P	P	N	N	G. B.
17—C S	A-161	F D		Q	P	N	P	Chronic Appendicitis
18—H M Mc	A-398	F D		P	P			Chr. App. Pericholycystitis
19—O N M	A-890	M D		Q	Q	N	Q	D. U. Chr. App.
20—E M R	A-977	F D		P	P	P	P	D. U.
21—Mr. B	A-1285	M D		P	P	P	P	D. U. Op. Aft. for Ob. Bowel
22—Sis. B	A-1288	F D		P	P	N	P	D. U.
23—J D	A-1324	F G		P	P			D. U. (G 1910; D U 1914)
24—H S	A-2209	F D		P	P	N	P	D. U.
25—C K O	A-2248	M G	D	P	P			Chr. G. U. Perf. Concom.
26—R B M	A-453	M D		P	P	N	P	Chr. App. Periduodenal
27—J E P	A-491	M D		P	P	N	P	D. U. Adh. Chr. App.
28—Mrs. C	A-559	F D		P	P	N	P	Chr. D. U.
29—Mr. F	A-560	M D		P	P		P	Chr. D. U.
30—A C	A-561	M D		P	Q	N		Syphilis; Chr. App.
31—C A P	A-562	M D		P	P	P	P	Chr. D. U.
32—E M	A-564	M D		P	P	Q	P	D. U.

33—R T C	A-567	M	D	P	N		D. U.
34—P B	A-568	M	D	N	Q	N	Duodenal Bands
35—F G	A-570	M	D	P	P	N P	D. U. 2d Portion
36—L C	A-571	M	D	P	N	P	D. U.
37—T J P	A-2419	M	D	P	P	P	Op. Elsewhere; no report
38—C A H	A-1833	M	D	P	P	P	D. U.
39—F L S	A-2461	F	D	P	P	Q P	D. U.
40—H S	A-2465	M	D	P	P	N P	D. U.
41—C B T	A-2483	M	D	P	P	P P	D. U.
42—A C L	A-3378	M	D	P	P	P P	D. U.
43—E S	A-3429	M	D	P		P	D. U.
44—J D	A-1324	M	D	P	P	P P	D. U.
45—A C C	A-6129	M	D	P	P	P	D. U. Chr. App.
46—J P H	A-6213	F	D	P	N	P Q	D. U. and G. B.
47—M Y	A-2221	M	D	Q	P	P	Umb. Hernia

TABLE V.—STATISTICAL DEDUCTIONS FROM TABLE IV.

		Gastric Ulcer	Duodenal Ulcer	Total
Number of Histories	Positive	13	27	40
	Negative	3	4	7
	Not Given	1	0	1
				48
Number Physical Findings	Positive	13	24	37
	Negative	3	6	9
	Not Given	1	1	2
				48
Number Clinical Findings	Positive	1	10	11
	Negative	3	13	16
	Not Given	13	9	22
				49
Number Roentgen Findings	Positive	6	23	29
	Negative	1	3	4
	Not Given	10	5	15
				48
Total Number Diagnoses (two concomitants, 5 per cent)		17	31	48
Total Number Males		11	22	33
Total Number Females		6	9	15

NOTE—Although in nine of these cases the diagnosis of ulcer is not sustained by operative report, nevertheless all were surgical cases and justified operation. Where perigastric and periduodenal adhesions are mentioned, they might have arisen from ulcer perforation or inflammation.

Case 2 diagnosis is not sustained, but the operative report is D. U., agreeing with the roentgen report.

Case 7 is a clear miss, not possible to explain.

Cases 14, 17, 34 and 47 are misses, and should be, as the evidence was entirely inadequate.

Cases 16, 18 and 30 are misses, and should be, as examination was incomplete. Criticism should not be so severe, however, as the evidence is strong.

TABLE VI.—OPERATIVE CASES WITH ROENTGEN FINDINGS

Patient's Name	Number	Sex	Diagnosis	History	Physical Findings	Clinical Findings	Roentgen Findings	Surgical Report
1—N C B	A-2450	M	G	P	P	N	P D	D. U. Chr. App.
2—G G	A-3138	M	G	P	P		P	Perigastric Adhesions
3—Mrs. R	A-5086	F	G	P	P		P	G. U.
4—M J	A-4878	F	G	P	P	N	P	G. Chr. App.
5—W P B	A-566	M	G	P	P		P	G. U.
6—A K J	A-4928	F	G	P	N		P	G. U.
7—J D M	A-3381	M	G	Q	P	N	N	Perigastric Adhesions
8—C F	A-5482	M	D	P	P	N	Q	G. B.
9—C S	A-161	F	D	Q	P	N	P	Chr. App.
10—O R N	A-890	M	D	Q	Q	N	P	D. U. Chr. App.
11—E N R	A-977	F	D	P	P	P	P	D. U.
12—Mr. B	A-1285	M	D	P	P	P	P	D. U.
13—Sis. B	A-1288	F	D	P	P	N	P	D. U.
14—D A J	A-2209	F	D	P	P	N	P	D. U.
15—R B M	A-453	M	D	P	P	N	P	Periduodenal; Chr. App.
16—J E P	A-491	M	D	P	P	N	P	D. U. Chr. App.
17—Mrs. C F	A-559	F	D	P	P	N	P	D. U.
18—Mr. F	A-560	F	D	P	P		P	D. U.
19—C A P	A-562	M	D	P	P	P	P	D. U.
20—E M	A-564	M	D	P	P	Q	P	D. U.
21—F G	A-570	M	D	P	P	N	P	Op. Elsewhere; no report
22—L C M	A-571	M	D	P	N		P	D. U.
23—T J P	A-2419	M	D	P	P		P	D. U.
24—C A H	A-1833	M	D	P	P	P	P	D. U.
25—F L S	A-2461	F	D	P	P	Q	P	D. U.
26—H S	A-2465	M	D	P	P	N	P	D. U.
27—C B T	A-2483	M	D	P	P	P	P	D. U.
28—A O L	A-3378	M	D	P	P	P	P	D. U.
29—E I W	A-3429	M	D	P		P	P	D. U.
30—J D	A-1324	M	D	P	P	P	P	D. U.
31—A C S	A-6129	M	D	P	P		P	D. U. Chr. App.
32—J P H	A-6213	F	D	P	N	P	Q	D. U. and G. B.
33—J Y	A-2221	M	D	Q	P		P	Umb. Hernia

TABLE VII.—ANALYSIS OF TABLE VI.

29 cases agree with the roentgen report.
4 cases are not in entire agreement with the roentgen report.

No. 1—Corrected the location of the ulcer made by clinician.

No. 2—"Perigastric adhesions" reported is a surgical case anyway, and may have been due to perforation or ulcer inflammation.

No. 8—"Doubtful" should have put the clinician on guard.

No. 9—"Chronic appendicitis" was a clear miss, although surgical exploration was justified.

No. 15—"Periduodenal adhesions and chronic appendicitis." The duodenal adhesions may be explained in the same way.

No. 33—"Umbilical hernia" was a clear miss. Examination was incomplete, due to difficulties in handling the patient. Exploration justified.

Roentgen evidence "Positive" is of great value.
Roentgen evidence "Negative" is of definite value.

SUMMARY

Roentgen Findings	Positive,	28
	Negative,	3
Number Histories	Positive,	29
	Negative,	4
Number Physical Findings	Positive,	28
	Negative,	4
Number Clinical Laboratory Findings	Positive,	9
	Negative,	15


W. B. Cannon

Cannon and His Work

THE little town of Prairie du Chien, Wisconsin may be justly proud of being the birthplace of Cannon even as Boston is to be congratulated for being the place of his professional investigations and research. Walter Bradford Cannon was born in Prairie du Chien, Wisconsin, in 1871. After receiving the degrees of A. B. and A. M. at Harvard, he took up the study of medicine in 1897 at the same place.

He is Fellow of the American Medical Association and is licensed to practice medicine in Massachusettes, but is not in practice, preferring rather research work and the teaching profession.

He resides at 2 Divinity Ave., Cambridge. His office is at the Harvard Medical School where he is Professor of Physiology in the school and in the graduate school.

The different societies which he honors by his membership demonstrate the happy variety of his interests. He is a' member of:

The Association of American Physicians.

The American Gastro-Enterological Association.

The American Roentgen Ray Society.

The National Academy and Sciences.

The American Philosophy Society.

The Society for Experimental Biology and Medicine.

The Massachusettes Medical Society.

The Boston Society of Medical Sciences.

Our immediate interest is in his work in roentgenology. When the rays were only a year old, Dr. Cannon was the first to demonstrate the possibility and practicality of studying the movements of the stomach and intestines by means of the x-rays. His paper on "The Movements of the Intestines Studied by Means of the Roentgen Rays" which was published in the American Journal of Physiology in Boston reads like a fairy tale even now to the uninitiated. At the present time, only about 25 years later, the wonders which it records are seen every day in any x-ray laboratory. But it is tremendously valuable as marking an epoch in the development of roentgenology and suggests what vast regions may be explored in the next 25 years. Following is an abstract of the paper cited.

Movements of the Intestines Studied by Means of the Roentgen Rays

W. B. CANNON, M. D.

Introduction

PATHOLOGICAL subjects or animals have been the only scources of our knowledge. The slowly-advancing peristaltic wave and the Pendelbewegung have been regarded as true physiological processes. There has been less agreement concerning anti-peristalsis and swiftly-running vermicular contraction. The best known is the normal peristaltic wave.

Pendulum movements are the gentle swaying motion of the coils and the rhythmical contractions of the intestinal wall. These continue even after paralysis of the local nervous mechanism by nicotine or cocaine.

The swift vermicular wave may pass the whole length of the intestine in about a minute. It is often seen just after death, as well as in pathological states. According to Starling this is an exaggeration of the rhythmic type. Mall puts it in a class by itself. Nothnagel says the movement is transitional between a physiological and a pathological activity.

The Method

Sub-nitrate of bismuth, one-tenth to one-third the weight of food was mixed with what was fed to the animal under observation. The animal was usually not allowed to eat anything during the day previous to examination, and was commonly given four to six teaspoonfuls of castor oil.

A tranquil mood on the part of the animal was found to be as necessary for seeing the movements of the intestine as for securing the normal activity of the stomach. On this account female cats were more favorable subjects than males.

Five hours and forty-five minutes after eating, the cat was placed on her back. The photo plate was placed over the front of the abdomen. By means of a leaden plate between the cat and the Crookes tube, the exposure was made during the pause recurrent at the end of each respiration when the shadows resume approximately their former position. Records were taken by means of radiographs and by means of tracings made with a soft pencil on tissue paper laid over the fluorescent surface of the screen.

Movement of the Small Intestine

When the food has been distributed through the intestine so as to present the appearance of long, narrow masses, a noticeable feature in most or all of the loops is a total absence of movement.

If the animal is quiet, in a few moments peculiar motions appear in one or another of the loops or in several and last for some time, suddenly dividing one of the long narrow masses into many little segments of nearly equal size. These segments are again suddenly divided and neighboring halves unite to make new segments, and so on. This process is called rhythmic segmentation of the intestinal contents. At the time of the third segmentation the segment which formed the end of the long narrow mass is not redivided. It varies in size with each division; is full size from the addition of a part of the nearest segment and a moment later is a small bit left after another division. The segment which is probably the rear of the mass shoots away when the end mass is divided and is swept back at each reunion to make the large end mass again. This movement is repeated with each recurrence of the constrictions. Segmentation continues commonly for more than half an hour without cessation. The food changes its position in the abdomen to only a slight extent, which may be a passing of the food along the loop or a movement of the loop itself.

Variations From the Typical Form of Rhythmic Segmentation

Sometimes, and especially if the mass of food is thick, constrictions do not make complete divisions and are so far apart that intermediate portions are relatively large and are also constricted not into halves but into thirds. If a little pointer is placed at the middle of a segment when the segments are completely divided into halves, in a few seconds the pointer will be in the middle of the clear space between two segments; in a few more seconds the first phase will return and the pointer will again indicate a segment. When portions are constricted into thirds, three operations intervene between similar phases as shown by the indicator.

The remarkable feature in segmentation of food is the rapidity with which it takes place. To estimate this, count not the number of times partition of food recurs in the same place, but the number of different sets of segments observed in a given period. In long thin chains of food the most common rate of division varies between 28 and 30 times a minute. In some cases the rate is as low as 23 times per minute. In larger masses of food, operations occurred from 18 to 21 times a minute. Segmentation frequently continues for more than half an hour and in one instance persisted for two hours and twenty-two minutes, with only three short periods of inactivity. At the rate of 30 segmentations per minute a slender mass of food may undergo division into small particles more than a thousand times while

scarcely changing its position in the intestine.

In a cat lightly etherized the exterior of an intestine which was dividing the food as described above, was seen. An hour and a half after a salmon meal the anesthetic was given, the abdomen was opened and flaps raised to form walls. Warm salt solution was then poured into the abdominal cavity and the floating coils left covered with the transparent omentum. The gastric peristaltic waves were running regularly. On the intestine there were visible at various places regions of constrictions. The constrictions recurred irregularly and at much longer intervals than in the normal animal.

The process of rhythmic segmentation brings the food over and over again into closest contact with the intestinal walls, thereby mixing the undigested food with the digestive juices and exposing the digested food to the organs of absorption. Also by compression of veins and lacteals of the intestinal wall the constrictions serve to deport through the blood and the lymph channels the digested and absorbed material.

Peristalsis is observed normally in two forms, as a slow advancing of the food for a short distance in a coil, and as a rapid movement sweeping the food without pause through several turns of the gut.

When the segmenting activity has gone on for some time, the separate segments may suddenly begin to move slowly along the loop in which they lie. When the front segment stops or meets other food the succeeding pieces are swept one by one into the accumulating mass which shows no sign of commotion.

Another form of slow peristalsis is frequently observed when the food is pushed forward as a large lump. This combines peristalsis and a segmentation into two parts.

Rhythmic Segmentation and the Pendulum Movement

The segmentation described is due to an activity of the intestinal musculature similar to that causing so-called pendulum movement. This activity is rhythmic and involves the longitudinal and circular layers of muscles. Observations of the effect of the rhythmic contractions upon the food show that the action of the circular fibres is most prominent. The function of the longitudinal muscles would be to contract between new rings of constriction and thereby aid in relaxing the former ring between them.

Bayliss and Starling state that the swaying pendulum movements are essentially due to peristaltic waves recurring in the same place and running rapidly downward. I have seen this form only once. About 90 c. c. of soapy water had been injected. The effect was to exaggerate in every particular

the movements of the small intestines. A broad constriction appeared about the middle of a long string of food and persisted there while it spread down the gut. As the contraction spread, the gut swayed slowly to and fro before it. Then there was a relaxation followed by recurrence of constriction in the same place and a spreading of the contraction. This phenomenon was repeated till finally the string of food was divided and the forward piece pushed on into the colon.

The Course of Food in the Small Intestine

Chyme is not forced from the stomach by every wave that passes over the antrum, but only at intervals. When the pylorus relaxes, the food, moved toward the pylorus under considerable pressure, is squirted along the duodenum for two centimeters or more. It lies in the curve of the duodenum until additions have been made to it from the stomach and a long thin string of food is formed. In this place it is exposed to the outpouring of the bile and pancreatic juices. Then segmentation begins and continues several minutes thoroughly mixing the intestinal digestive juices with the chyme. Finally the little segments unite in a single mass or in groups, move forward very rapidly for some distance when the food is collected in thicker and longer strings characteristic in other loops.

During the first stages of digestion in the cat's small intestine the food usually lies chiefly on the right side of the abdomen; during the last stages, on the left side. After remaining, some times for an hour or more, with no sign of movement, rhythmic segmentation begins, and by a process of kneading and peristaltic advance the food is brought to the ileocaecal valve to enter the large intestine. Records from ten different animals show that salmon does not appear in the small intestine until one or one and a half hours after the food is eaten; and not in the colon until five or six hours after eating. The chyme thus takes four or five hours to pass the length of the small intestine. The operations are shortened if the meal has consisted of bread and milk.

Competence of the Ileocaecal Valve

The competence of the valve for the food which enters the colon from the ileum is perfect. The activity of the colon proves this statement. The failure of every attempt to drive the food in the colon back through the valve into the ileum confirms the proof. Again and again I have tried, by manipulation through the abdominal wall, to press the normal contents of the colon downward with sufficient force to cause them to return to the small intestine, but without success.

Movements of the Large Intestine

In the descending colon the material which is usually hard and in incompressible lumps is very slowly advanced by rings of tonic constrictions; in the ascending and transverse colon and caecum the soft material is commonly subjected to an antiperistalsis movement.

Antiperistalsis in the Colon

The colon of cats which have been without food for a day usually contains enough gas to make the position of the gut distinguishable with the fluorescent screen. The contents of the colon, instead of being driven immediately toward the rectum by slow peristalsis are first repeatedly pushed toward the caecum by an antiperistaltic action.

These antiperistaltic waves begin either on the more advanced portion of the food in the colon (when only a small amount is present), or at the nearest tonic constriction which is usually at the turn between the transverse and descending colon; follow one another like the peristaltic waves of the stomach; and rarely run continuously for a long time. When the colon is full, it is usually quiet. The first sign of activity is an irregular undulation of the walls. Then faint constrictions pass along the gut toward the caecum. When the waves become more prominent they are seen to start near the end of the transverse colon and pass without interruption to the end of the caecum. After a few minutes the indentations grow gradually less marked and finally are hardly discernible.

The period of antiperistalsis lasts from two to eight minutes with an average duration of four to five minutes; recurs at varying lengths of time; and the waves have nearly the same rate of recurrence as those in the stomach, i. e., eleven waves in two minutes.

Usually the almost immediate result of a rectal injection of warm water is the appearance of deep antiperistaltic waves, which often continue running for a long period of time, an hour and 20 minutes in one case observed.

These constrictions passing backward over the colon do not force the normal contents back through the valve into the small intestine. In hundreds of such constrictions observed, only two exceptions to this rule were found. The importance of the competence of the ileocaecal valve is now apparent. Inasmuch as the valve is normally competent the constrictions repeatedly coursing toward it force the food before them into a blind sac. Since it cannot go onward in the blind sac and is subjected to increasing pressure as the constriction comes nearer, it is forced into the only way of escape, i. e. away from the caecum through the advancing constricted ring. The result is a thorough mixing of the

contents and a bringing of these contents into close contact with the absorbing wall, a process variously repeated many times in the stomach and small intestine.

Two Other Movements Observed But Rarely in the Ascending Colon

One was a serial sectioning of the contents in an animal given castor oil with the food. A constriction separated a small segment in the caecum; another constriction then cut off a segment just above the first, and with the disappearance of the first constriction, the two separated segments united. The whole mass was sectioned from one end to the other and the process was immediately repeated several times. The second of the two movements consisted in a gentle kneading of the contents caused by broad constrictions appearing, relaxing, appearing, relaxing, over and over again in the same place. Once a constriction occurred and remained permanently in one place while the bulging parts on either side of it pulsated alternately at the rate of about 18 times in a minute, with the regularity of the heart-beat.

The Changes When Food Enters the Colon

The passage of food through the ileocaecal valves seems to stimulate the colon to activity. The moment it has entered the colon, a strong contraction takes place all along the caecum and the beginning of the ascending colon, pressing some of the food onward. A moment later deep antiperistaltic waves sweep down from the transverse colon and continue running until the caecum is again normally full, i. e. for two or three minutes.

The Appearance of Tonic Constrictions

As food accumulates in the ascending colon it is at first confined to this region by antiperistaltic waves. With further accessions the contents are pressed more and more into the transverse and descending colon. As the contents extend along the intestine a deep constriction appears near the advancing end and nearly separates a globular mass from the main body of the food. New tonic constrictions appear which separate the contents into a series of globular masses. The rings disappear from the transverse colon and then are present in the descending colon. In the transverse colon which is free from the slowly-moving rings the antiperistaltic waves have full sway. The persistent slowly-moving rings away from the caecum form the waste matter into globular masses at the end of the transverse colon and slowly push these masses onward.

Defecation

Food was observed in the colon of the animal observed at 3:11 p. m. About 3:25 the gut swung around with a slow sweeping movement; the ascending colon lying in the position of

the last half of the transverse colon; the transverse colon taking the position of the descending part. The tonic constrictions disappeared. Strong broad contraction of the circular muscle tapered the contents off on either side in two cones. The region of strongest contraction was apparently drawn downward with the rest of the gut by a shortening of the descending colon. As the intestine swung round, more material was forced into the rectum, and when the swinging of the intestine stopped the constriction which divided the lumen passed slowly downward and with the aid of the muscles surrounding the abdominal cavity, pushed the separated mass out of the canal. After which the colon with the remainder of its contents returned to nearly its former position. Most of the contents of the caecum and the ascending colon may be passed onward even during starvation. The only activities manifested are the antiperistaltic waves, and the strong tonic contraction of the whole circular musculature.

Observations indicate that either a general contraction of the wall of the large intestine or a true peristalsis may be effective in pressing waste matter from the region where antiperistalsis is the usual activity into the region where the slowly advancing rings may carry it on to evacuation.

Enemata consisting of 100 c. c. of milk, one egg, 10 to 15 grams of bismuth subnitrate, and two grams of starch to hold the bismuth powder in suspension were used. To make a thick enema all were stirred together and boiled together and boiled to a soft mush; to make a thin enema, all ingredients were boiled together except the egg, which was added after the boiled substance was cooled. The small amount injected was 25 c. c.; the large almost 90 c. c. The animals were given first a cleansing injection and when this was effective the nutrient material was introduced.. A control radiograph was first taken to show no bismuth food present, and other radiographs taken at varying intervals after the injection to record the course the food was following.

These experiments show that when small amounts of nutrient fluids are introduced they lie first in the descending colon. In every case antiperistaltic waves are set going by the injection and the material is thereby carried to the caecum. Large amounts injected stop for a moment in the region between the transverse and descending colon as if a constriction existed there. Then a considerable amount of the fluid passes the point and antiperistaltic waves carry it to the caecum. In any case the repeated passing of the waves seems to have the effect of promoting absorption, for in the region where these waves continue running, the shad-

ows become gradually more dim and finally bismuth appears to be only on the intestinal walls; in other regions, e. g., in the descending colon, the shadows retain their original intensity. I have never seen small injections forced even in part into the small intestine. With the larger amount whether fluid or mushy, the radiographs show many coils of the small intestine containing the bismuth food.

The passage of the injected material beyond the ileocaecal valve is probably due entirely to antiperistalsis in the colon. The valve which is thoroughly competent for food coming normally from the small intestine into the large is curiously incompetent for even a thick creamy substance introduced in large amount by rectum.

I have never seen food material pass back from the colon so far as the stomach; but once, about ten minutes after an injection of 100 c. c. of warm water, the cat retched and vomited a clear fluid resembling mixed water and mucus. In the fluid were two intestinal worms still alive.

In the colon the nutrient material of the enemata is worked over by the antiperistaltic waves, mixed with digestive juices present and exposed to the organs of absorption in that region. If the enemata are large, the digestive and absorptive processes may also take place along extensive surfaces of the small intestine.

The Effect of Emotions and Sleep

Observations on the stomach of the cat showed that the peristalsis is inhibited whenever the animal manifests signs of anxiety, rage or distress. Many emotional states are a strong stimulus to peristalsis, but other emotional states inhibit peristalsis. In the cat the same conditions which stop the movements of the stomach, stop also the movements of the intestines.

When the segmentation process in the small intestine is stopped by excitement the segments unite and the series of parts returns to the form of a solid string. In a descending colon where the antiperistalsis were inhibited by excitement the tonic constrictions were apparently not affected.

As soon as a cat shows distress when its breathing is artificially stopped every form of intestinal movement stops.

The statement is sometimes made that gastric and intestinal mechanisms cease to act during sleep; and that night time is their normal time for repose. But though nearly all the animals curled up and slept during the time between observations, nevertheless the progress of the food through the intestines was continuous and I have seen both large and small intestines actively at work from half past nine until half past ten o'clock at night.

Summary

1. Bismuth subnitrate, 10 to 33 per cent, mixed with the food

renders the movement of the intestinal contents,—and thereby the movements of the intestinal walls,—visible on the fluorescent screen.

2. The activity most common in the small intestine is rhythmic segmentation which in the cat proceeds at the rate of 30 divisions per minute, mixing the food and the digestive juices, bringing the digested food into contact with the absorbing mechanisms, and emptying the venous and lymphatic radicles of their contents by compression of the intestinal wall.

3. Peristalsis is usually combined with segmentation, interfering constrictions often momentarily separating the rear end of an advancing mass of food from the main body.

4. The ileocaecal valve is thoroughly competent for food entering the colon from the ileum.

5. The usual movement of the transverse and ascending colon and the caecum is an antiperistalsis, recurring in periods of five minutes each about every 15 minutes and giving new significance to the ileocaecal valve; for the food, now in a closed sac is thoroughly acted upon without any interference with the processes in the small intestine.

6. When new food enters the large intestine a strong general contraction immediately takes place along the caecum and ascending colon, forcing some of the food onward; a moment later antiperistaltic waves begin to pass.

7. With the accumulation of material in the transverse colon, deep tonic constrictions appear one after another, carrying the material into the descending colon and leaving the transverse and ascending portions free for the antiperistaltic waves.

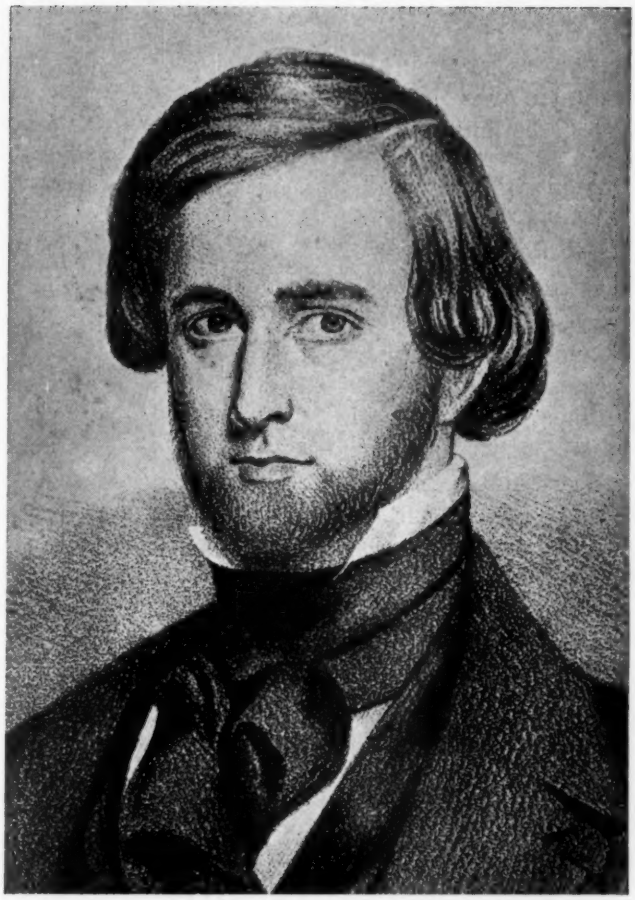
8. In emptying the large intestine the material in the lower descending colon is first carried out by combined peristalsis and pressure of abdominal muscles; the remainder of the material is then spread into the evacuated region, and this region is again cleared. In normal life the new food arriving in the colon must force forward the old contents of the ascending and transverse colon.

9. Observations have revealed no evidence of antiperistalsis in the small intestine, but, since the ileocaecal valve will allow nutrient material under pressure to pass backward, the antiperistalsis of the large intestine may force into the small intestine a considerable portion of a large nutrient enema. Segmentation in the small intestine affects such an enema precisely as it affects food passed normally through the stomach.

10. Signs of emotion, such as fear, distress, or rage, are accompanied by a total cessation of movements of both large and small intestines. The movements continue in the cat both during sleep and at night.

[American Journal Physiology, Boston, 1901-2, vi. 251.]

Ether as an Anesthetic



Dr. Morton at 24 years of age. Picture hangs in Ether Room of Massachusetts General Hospital, Boston.

THE use of ether as an anesthetic has become such a common and general daily occurrence that it scarcely seems possible that this use is but 75 years old the 16th of this coming October. Before that time ether was not unknown. The story is that at that time there was hardly a gathering of young people which did not end with an "Ether Frolic"; the girls and boys finishing the evening by inhaling ether,—some would laugh, some cry, some fight and some dance. On one occasion when they had exhausted their own possibilities they haled a negro boy who was peeping through the door and while he fought and struggled,

they etherized him into insensibility. When he lay quiet and unconscious his tormentors became thoroughly panic stricken and sent for Dr. Long. But as we should now expect, the victim soon came to himself, none the worse for his mishandling.

It was not until 1846 that the drug graduated from being the plaything of fun-loving youth or even the means of deadening pain in such slight operations as teeth extractions and was recognized as the "greatest discovery ever made", "the most precious heroic agent against pain". While courts may wrangle over the question of who personally is to bear the laurels for first finding the ether anesthetic, Boston will always be definitely credited with being the geographic theater where its use as an anesthetic was first proved. The case was a man, a printer, tall and feeble, with a tubercular heredity, who was brought into the amphitheater of the Massachusetts General Hospital for operation on a "congenital but superficial vascular tumor" just below the jaw, on the left side of the neck. J. C. Warren was the surgeon and the ether was administered by Wm. T. G. Morton. At the hour appointed on the momentous 16th of October, the scene was all set for the ether drama, the surgeon and his patient were ready, the members of the Surgical Staff were present, the seats in the amphitheater were filled by the class from the Medical School. Fifteen minutes later Morton, who had been delayed by repairs upon his inhaler rushed into the room and proceeded with his novel duties. There being no time for confidences Warren did his expert work in ignorance of the agent at his command and completed it in five minutes. Then turning to his audience while his patient, rapidly recovering, still lay half-stupefied on the table he paid tribute to the drug by saying, "Gentlemen, this is no humbug".

Close upon the heels of this operation followed one for a large, fatty tumor of the shoulder and then the amputation of a limb. Such was the introduction to the world of ether as an anesthetic. "The degree to which this ether insensibility could be carried, the safety with which this could be done and the uses to which this state could be put" were problems yet to be laboriously worked out. But the introduction was complete. And while the world may never wholly satisfy itself as to whom to give the credit for finding the anesthetic it will always pay tribute to and rejoice with Boston as being the theater of its introduction to the world.

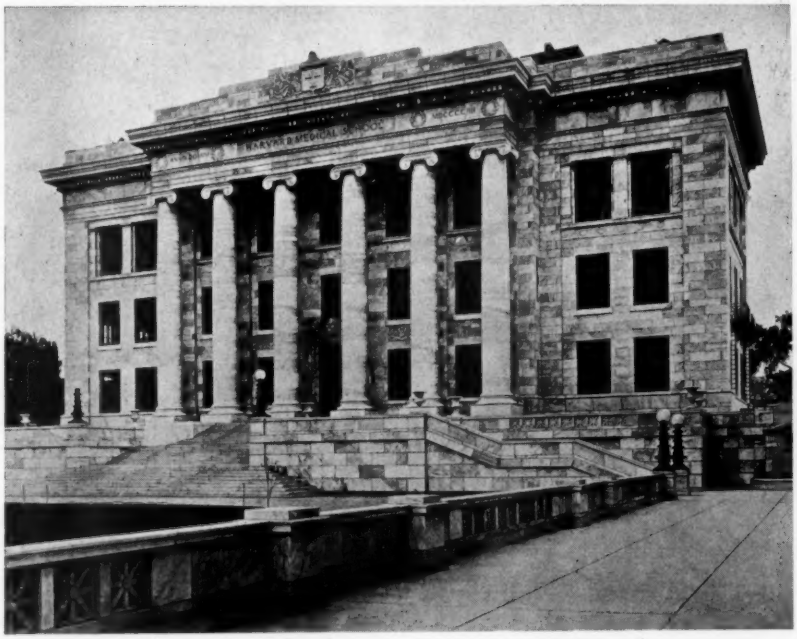
Bibliography.

A Narrative of Medicine in America. James Gregory Mumford, M. D.
Ether (Anesthetic)—Charles T. Jackson.

Boston, The City

(Boston Chamber of Commerce)

PARTICULAR interest is attached at this time to Boston, both because of forthcoming conventions to be held, and because of the series of Plymouth and Provincetown Tercentenary Celebrations, scheduled for this spring and summer. More and more, New England, of which Boston is the very center, is coming to be regarded as the ideal playground of America. The mountains, lakes, woodlands, sea-shores, magnificent drives, gorgeous scenes and salubrious climate have always attracted thousands of tourists and pleasure and health seekers during the hot months of the year. Historical scenes, of which the New England states abound, have always commanded the intense interest of school children. The foundation stones of American independence and of national consciousness were laid there, and nearly all the great reforms and movements were mothered in or near Boston.



Main building of Harvard Medical School, Boston.

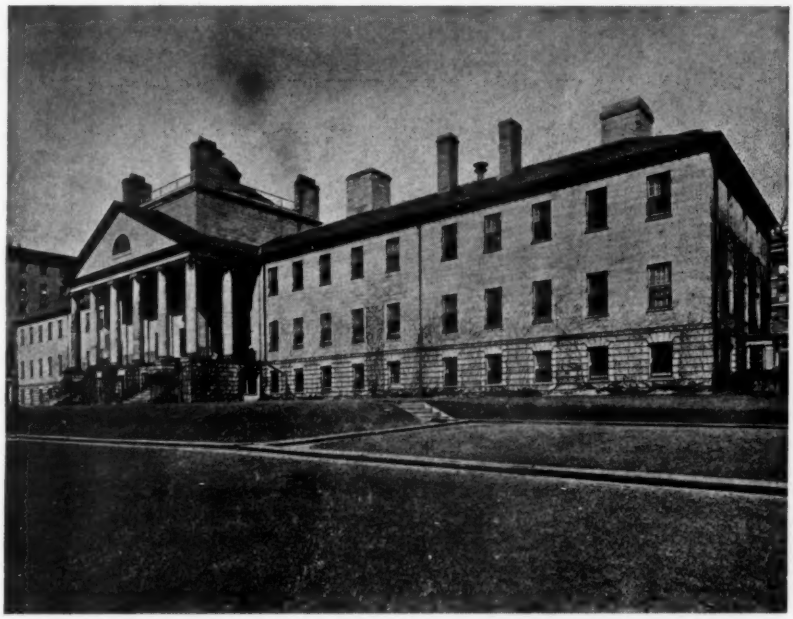
In recent years, attentive consideration has been given by hotels, railroads, touring companies and pleasure resorts to visitors from a distance so as to provide the fullest information and to enable them

to make the most of their vacation spent in that section. Recently the Boston Chamber of Commerce created a Convention and Tourist Bureau, designed to provide such information as may be asked by tourists and visitors and to assist in arranging tours and in supplying information when called upon.

Main building of Peter Bent Brigham Hospital, Boston.

In no other city in America may there be found such a wealth of historic data and the actual scenes and symbols of the events that made up the early history of the country. These old landmarks have been sacredly preserved and clearly defined, and provision has been made by the railroads, trolley lines and automobile touring companies to take visitors to them comfortably and inexpensively. The chief historical attraction this coming year, both by reason of the generous appropriation made by the Federal Government and by the State of Massachusetts, will be the series of events at Provincetown and Plymouth, both of which towns are erecting notable permanent memorials. A series of twelve pageants will be given during the summer at Plymouth, and among the visitors who have already accepted invitations are included President Harding and Vice-President Coolidge. President Harding will be conveyed to Plymouth by the presidential yacht, the Mayflower, the namesake of the old Pilgrim boat.

Boston, as the shipping and receiving center for New England, handles a wide variety of products. Among the leading exports are meats and dairy products, boots, shoes and leather, breadstuffs, iron and steel products, tobacco, cotton and cotton manufactures. Chief among its imports are wool, cotton, sugar and molasses, hides and skins, fibers, silk and fruit.



Main building of Massachusetts General Hospital. Ether Room in dome.

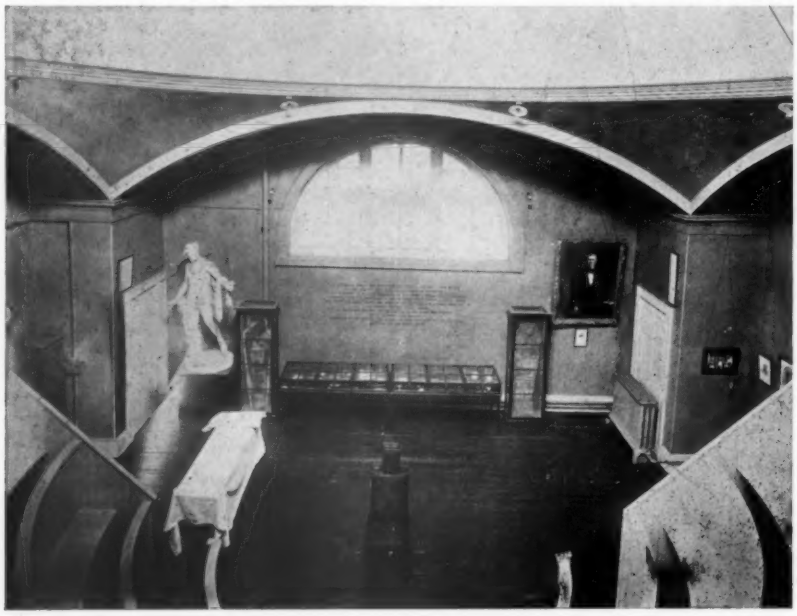
As a center of industry, Boston has the reputation of sending forth a more diversified array of manufactured products than any other community in the United States. From a hairpin to a superdreadnought; from the famous "Boston Garter" to the finest woolen products in the world, the metropolitan manufacturing district of Boston produces nearly everything required for the needs of humankind.

For more than 150 years, New England skill and workmanship in the production of manufactured articles have been highly regarded in the markets of the world. With little more than 7 per cent of the population of the United States, it produces annually more than 13 per cent of the value of the country's manufactured goods. This section produces 48 per cent of all the cotton goods made in the United States; more than 55 per cent of the woolen and worsted goods; nearly 54 per cent of the boots and shoes; 40 per cent of the

jewelry; 50 per cent of the brass and brass fittings; and most stupendous of all 87.5 per cent of the machine tools. Truly an industrial empire!

Of the New England group, Massachusetts is the most intensively organized state in an industrial sense, producing much more than half of the goods manufactured in the six states. Small as Massachusetts is in physical comparison with some of the great states of the Union, it holds fourth rank among the states in the volume of goods manufactured, with a production value of nearly four billion dollars in 1918, the last year for which statistics are available.

In a score of industries Massachusetts is supreme in the Western Hemisphere, and in some very important branches of manufacture she leads the world. It may be news to some that nearly one-half the boots and shoes manufactured in the United States are made in Massachusetts to the value of $361,090,261; that one-third of all cotton goods, worth $537,631,796, and one-third of the woolen and worsted goods, worth $464,067,705, are produced in the little "Bay State."



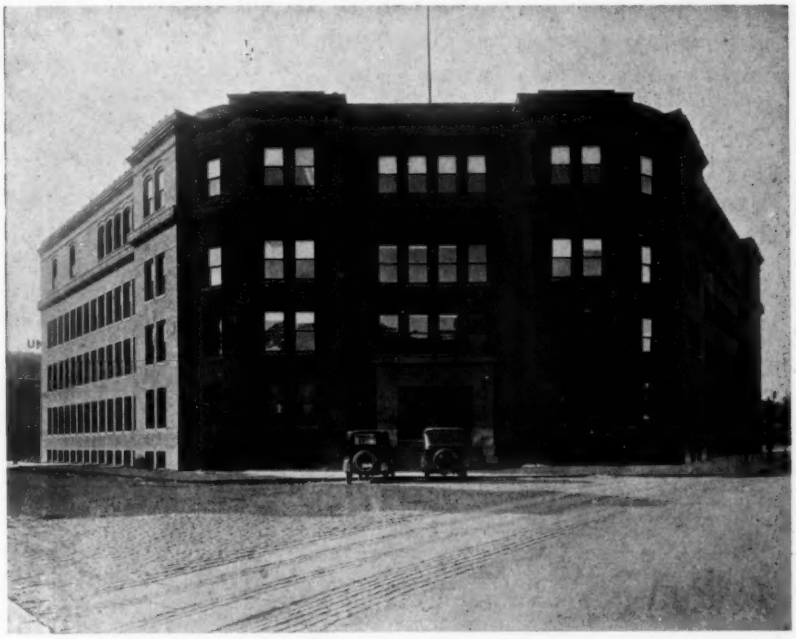
Ether Room—Massachusetts Hospital, Boston.

She also produces an impressive volume of foundry and machine-shop products, leather preparations, exclusive of boots and shoes, cut stock and findings and other auxiliaries of the gigantic boot and shoe industry; electrical machinery and apparatus, paper and wood pulp, meat

and other food products. The striking variety of her products is shown by the fact that 166 major industries received classification exclusive of a group of practically 100 other minor industries.

It is natural that Massachusetts should be the leading market for the raw materials which enter into the making of her great products. As showing how this holds true, Boston in 1918 imported wool to the value of $177,896,026, which means, in other words, that Boston is the greatest wool port in the world.

Metropolitan Boston, with a population of about 1,800,000 persons, has nearly 5,000 industrial establishments producing annually manufactures valued at nearly a billion and a half dollars, and employing on an average of 250,000 wage earners. In variety, its products are probably more extensive than those of any similar community in the United States. It has 103 major industry groupings and about 60 minor lines of industry.



Tuft's Medical School, Boston.

In higher educational institutions Boston again stands forth. Harvard, Tufts, and Boston universities, Massachusetts Institute of Technology, Radcliffe, Simmons, Wellesley and Boston colleges are examples of the great educational forces which draw the attention of the world to Boston. They are too well known to need encomium; their alumni and alumnae are to be found in every coun-

try on the globe. In the Boston Conservatory of Music this city presents the finest college of music in the United States; in the Harvard medical group are the finest buildings devoted to this science in the country.

The real Boston, better known as the metropolitan district, embraces 40 cities and towns within a radius of 15 miles from the State House at Boston. In this district live about 1,800,000 persons, who in every essential respect are Bostonians as much as if they lived on Beacon Hill. In this district there is one main street car system, one telephone system, one main water supply, a principal sewerage service administered by a single board, and one general park service. It is one district for fire prevention, one postal district, one banking district, one commercial and industrial center —all built around one great harbor.

Boston is the industrial and commercial center, the marketplace and the natural outlet of New England. To a large degree it is the civic, economic and intellectual dictator of an empire of 8,000,000 persons.

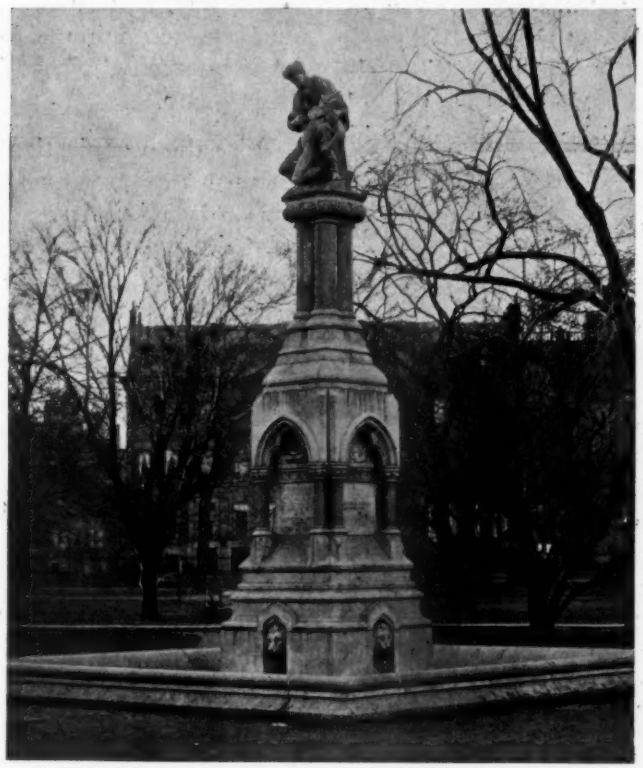
Its geographical advantage and the ease and rapidity with which vessels can get to open sea combine to make the ocean trip between Boston and the great European ports shorter by fully 24 hours than from any other large American port.

In respect to piers and docking facilities, Boston is probably unrivalled, and is certainly not surpassed, by any American port. Commonwealth pier No. 5, built by the state, is held by Bostonians to be the greatest passenger and freight pier in the world. It is 1,200 feet long, 400 feet wide and will accommodate five 600-foot ships at one time. It comprises three two-story buildings of steel and concrete construction containing 900,000 square feet of floor space. Its cost (when money was on its feet) was $4,500,000.

The new Boston fish pier, successor to the famous old T wharf, as the headquarters of Boston's fresh fish industry, is another Commonwealth enterprise. It is generally agreed that no fish pier in the world approaches Boston's in adaptability and service. It provides dock berths for at least 40 vessels, and 80 vessels can unload to the pier at one time. It is linked up by a trolley freight line with the traction system of Greater Boston, and spur tracks connect it with railroad lines which interchange with the great trunk systems of the country.

Boston possesses the finest fish pier in the world, and has become in the past two years the leading fish market of the world. Boston was selected as the site of the great army supply base at the outbreak of the war, and $40,000,000 were spent by the Government for facilities for the economic handling of freight at this termi-

nal. At one time during the war, wool and army supplies valued at more than one billion dollars were stored in the new warehouse. The State of Massachusetts is now working upon a project whereby 600 acres of flat lands will be used for extensive commercial development.



ETHER STATUE, BOSTON PUBLIC GARDEN
Erected 1867, by Thomas Lee.

The following inscriptions appear on the sides of the statue:

"To commemorate the discovery that the inhaling of ether causes insensibility to pain. First proved to the world at The Massachusetts General Hospital in Boston.
October, MDCCCXLVI."

"Neither shall there be any more pain."

"In gratitude for the relief of human suffering by the inhalation of ether.
A citizen of Boston has erected this monument.
1867."

"This also cometh forth from the Lord of Hosts, which is wonderful in council, and excellent in working."

Walter James Dodd

(1869-1916)

Percy Brown

WALTER JAMES DODD, pioneer roentgenologist and a martyr to his specialty, was born in London, Eng., in the year 1869, and came to this country as an immigrant boy at the age of 15. He was early moved to follow the sea, but was induced by the college authorities, impressed by his ability, to continue life here as an assistant in the chemical laboratory of Harvard College in Cambridge, Massachusetts. He acquired a profound knowledge of chemistry and in 1892 was appointed to the Massachusetts General Hospital as assistant apothecary and four years later as apothecary. It was in this capacity that he undertook experimentation with x-rays under the usual unfortunate and restricted conditions which obtained in the early days. A severe dermatitis was therefore sustained in 1896 and he underwent his first operation for its results in 1898. Since that time he had been the subject of fifty operations for roentgen dermatitis and its sequelae.

Seeking to dignify further his work, which already through his sacrifices had attained high dignity, Dr. Dodd studied at the Harvard Medical School in 1900 and 1901, but completed his course and was graduated from the medical department of the University of Vermont in 1908. From that year until his death he held the position of roentgenologist to the Massachusetts General Hospital, an official recognition of what had been, in reality, his position for many years.

With the organization of a department of roentgenology in Harvard University, he was appointed instructor, a position which he held at the time of his death. He was an honored member of the St. Botolph Club of Boston, as well as of many medical societies, in addition to his membership in the American Roentgen Ray Society.

He married Margaret Lea of Moncton, Nova Scotia.

Dr. Dodd died December 18, 1916, following still another operation for infected glands.

Such, briefly, were the events in a life of singular beauty—the life of a gentle man, loving and beloved; cheerful beyond conception in the face of physical anguish. Glorified by a martyr's soul, his face turned toward the horizon of high purpose, with an obliteration of self that cheapened and made tawdry the usual motives of ordinary men. He journeyed steadily on toward that horizon, turning into the gold of loyal

friendship all those who came within the Midas-touch of his personality.

A life such as his gives charity a new meaning. As a crown to its later years, his ear was alert to hear from the far land of his adoption, the call of the nation of his birth, in dire need of the peculiar service which he could give. Disdaining physical handicaps and added risks, he hastened forth to labor for England with a heroism that even she knew not of.

Thus again have fallen the burden and the staff and again has another been received into the glorious band of those that self-sacrifice, upon the altar of a noble cause, has immortalized.

[American Journal of Roentgenology, January, 1917.]

Journal of Radiology

A Journal of Ideas and Ideals.

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State Medicine

MUCH discussion on the question of state medicine is being indulged by the profession. Perhaps it would be advisable to consider the entire subject under the fluoroscope of public interest. It is possible we could thereby contribute something to the sum total of effort if not of knowledge and reason, and ascertain by point of contact something of our own relation to the subject.

Being of that mind, we anticipate we shall have something to say on different phases of the question from time to time, as they occur or are suggested to us. We shall try, however, in any comment we may make to hold a strictly impartial attitude. We approach the question with open mind.

Jumping over the usual frumpery with which questions of this magnitude are vested, it seems to us there are at least three major divisions into which the motivating causes naturally fall. They may be stated:

1. Those naturally flowing from the trend of the profession toward specialism, with its consequent duplication of medical cost to the patient.

2. Those growing out of dilletantism on the part of some members of the profession who practice to live and do not live to practice.

3. Those arising from the failure of the profession to acquaint the public with true conditions and thereby keep it in full sympathy with the difficulties naturally inherent in this sort of humanitarian service, and likewise familiar with the struggles, hopes, and ideals which inspire those men who render such service in its true form.

Viewed as a medico-economic question, certain deductions are irresistible:

1. That the trend toward specialism should decrease rather than increase the cost of the particular service rendered and at the same time increase the earning power of the specialist.

2. That specialism requires per se more exact knowledge of some one classification of the profession in its relation to all others, so the buyer of service secures a positive and coördinated rather than a negative and general service.

3. That the medical adviser is in fact a quasi-public servant; for which reason, the more so because of the confidential nature of his employment, the public is entitled to know as much as he can possibly know about the whys and wherefores of diagnoses made and treatment prescribed, as well as the general research being conducted in the broad aspects of all branches of medical science. This is supported by all the laws of morals, legal procedure, and psychology.

The Boston Meeting

ARRANGEMENTS have now been completed for the summer meeting of the Radiological Society, which will be held in Boston, June 3rd and 4th, at the Copley Plaza Hotel. The program is practically complete and we can assure you that it will be well worth your attendance.

A banquet will be given in the evening, followed by a lantern slide exhibit. We feel that every one who contemplates attending the meeting of the American Medical Association should go a couple of days earlier and attend the meeting of the Radiological Society.

The Boston Program

1—"The Treatment of Epithelioma of the Lip".....
.....Dr. Douglas Quick, New York City
2—"Further Observation of X-Ray Examination of Mastoid Disease"....
.....Dr. Isaac Gerber, Providence, R. I.
3—"Means of Measuring or Specifying X-Ray Dose Given".....
.....N. E. Dorsey, Ph. D., Washington, D. C.
4—"Recent Developments in Deep Therapy Technique—Facts and Fancies"
.....Dr. A. F. Tyler, Omaha, Nebr.
5—"The Possibilities of Pneumoperitoneum in Gastro-Intestinal Diagnosis".....Dr. L. R. Sante, St. Louis, Mo.
6—"Paget's Disease".....Dr. I. S. Hirsch, New York City
7—"An X-Ray Study of the Healing of Benign Bone Cysts" (Lantern Slide Demonstration).....Dr. Joseph Colt Bloodgood, Baltimore, Md.
8—"High Voltage Problems".....Dr. W. D. Coolidge, Schenectady, N. Y.
9—"Further Consideration of Upper Right Quadrant".....
.....Dr. Arial George, Boston, Mass.
10—"Roentgenological Study of Eight Primary Lung Carcinomas".....
.....Dr. Lloyd Bryan, San Francisco, Calif.
11—"Observations in the Use of Radiation in Leukemias".....
.....Dr. Albert Soiland, Los Angeles, California
12—"The Determination of Dental Focal Infection by Means of the Radiogram".....Dr. Maximilian J. Hubeny, Chicago, Ill.
13—"The Advantages of a Uniform Angle of Twelve Degrees in Examining Accessory Sinuses and Mastoids".....Dr. A. F. Holding
14—"Report of Five Cases of Hernia of the Diaphragm. Differential Diagnosis from Eventration".....Dr. L. T. LeWald, New York City
15—"The Dead Tooth and X-Ray Indications for Extraction, and the Failure of Root Canal Treatment".....Dr. Byron C. Darling, New York City
16—"The Relationship of the Roentgenologist to Group Medicine".....
.....Dr. Frank S. Bissell, Minneapolis, Minn.
17—"Duodenal Bulb Deformity in Relation to Symptoms and Chemistry of the Gastric Juice".....Dr. A. W. Crane, Kalamazoo, Mich.
18—"A Retrospective Note Concerning Treatment of Tonsilitis by X-Ray"
.....Dr. H. W. Van Allen, Springfield, Mass.
19—"Atrophy of Lymphatic and Tonsillar Tissue by Radium and X-Ray"
.....Dr. C. Augustus Simpson, Washington, D. C.
20—Dr. Harry H. Bowing, Rochester, Minn....(Title, to be announced later)
21—"The Roentgenologic Aspect of Pulmonary Metastasis".....
.....Dr. Russell Carman, Rochester, Minn.
22—"The Law and Medicine, with Special Reference to Radiology".....
.....Dr. I. S. Trostler, Chicago, Ill.
23—"Consideration of Oesophageal Diseases".....
.....Dr. P. F. Butler, Boston City Hospital
24—"Radio Therapy in Superficial Malignancy".....
.....Dr. G. W. Grier, Pittsburgh, Pa.
25—"Effect of Cellular Reaction Induced by X-Rays on the Site of Cancer Crafts".....Dr. James D. Murphy, Rockefeller Institute

26—Dr. James Ewing, Cornell Medical College, New York City.....
.....(Title, to be announced later)
27—"Further Consideration Concerning Direct, Indirect and Secondary Rays and the Ray of Selective Absorption".....
.....Dr. Lewis Gregory Cole, New York City
28—"Dermoid Cysts in the Thoracic Cavity".....
.....Dr. John T. Murphy, Toledo, Ohio
29—"Present Status of Roentgen and Radium Treatment of Cancer of the Breast".....Dr. Thos. A. Groover, Washington, D. C.
30—Dr. Arthur W. Erskine, Cedar Rapids, Ia....(Title, to be announced later)
31—"Post-Operative Mastoid Treatments with X-Ray".....
.....Dr. Charles Goosman, Cincinnati, Ohio
32—"Treatment of Naevi".....Dr. R. H. Stevens, Detroit, Mich.

The Canadian Radiological Society

THE Canadian Radiological Society will hold its annual meeting in conjunction with the meeting of the Ontario Radiological Society, at Niagara Falls, May 31st to June 4th, inclusive.

An invitation is extended to all members of the Radiological Society of North America to attend this meeting. The program is unexcelled and well worth the attention of any one interested in this subject.

We hope that a large number of men from the States will attend this meeting. The Canadians have been very faithful in lending their interest and co-operation to the advancement of Radiology in the States and it is only just and right that we return this courtesy at this time.

Omaha Roentgen Society Entertained at Lincoln

NO MORE enjoyable event has ever occurred in the history of the Omaha Roentgen Society than the entertainment given in its honor by Dr. E. W. Rowe and Dr. R. L. Smith of Lincoln, on the evening of March the 19th.

The Lincoln men acted as hosts for the entire membership of the Omaha society and a number of invited guests. We were entertained royally at a dinner beginning at seven o'clock, at which time plates were laid for seventy-five. Immediately after the dinner, the following program was given:

The Relation of Roentgenology to Internal Medicine—Dr. G. W. Covey.

The Relation of Roentgenology to Rhinology and Otology—Dr. J. J. Hompes.

The Relation of Roentgenology to Orthopedics—Dr. H. W. Orr.

The Relation of Roentgenology to Dentistry—Dr. F. W. Webster.

The Relation of Roentgenology to Surgery—Dr. J. S. Welch.

New Methods in Sinus Diagnosis—Dr. W. Walter Wasson.

Therapy—Dr. Edward H. Skinner.

The papers given at this meeting will appear in the Journal in the near future.

Excellent taste was shown in the artistic programs furnished, the cover being actual photographic paper, on the front and back of which had been printed reductions of actual x-ray plates. On the front of each cover was the guest's name so that the program served as a place card.

We are sure that this get-together meeting was conducive of good fellowship in a way which will be lasting and will cement the friendships closer than ever before.

Department of Technique

Examination of the Wrist

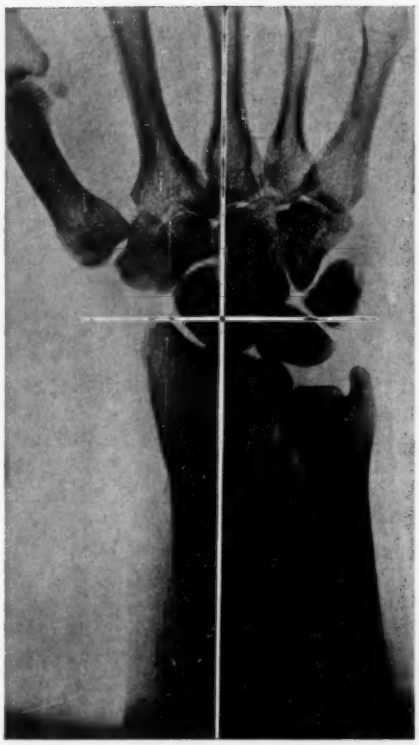

Fig I.—Anteroposterior view of wrist, showing Skinner's lines. Note distance between horizontal line and styloid process of ulna.

IN MAKING x-ray examination of injuries to the wrist, we should bear in mind the possibility not only of injury to the lower end of the radius, which of course is the most common fracture that we have, but we should also remember that frequently injuries to the wrist are complicated by fractures of one or more of the carpal bones. In order that we may not overlook fractures of the carpal bones, it is necessary not only to make plates in the lateral, as well as in the antero-posterior position, but we should also make stereoscopic plates in the antero-posterior position. Anyone who employs the steroscopic examination in addition to the lateral view, will be greatly interested in noticing the number of fractures of the carpal bones which have been previously overlooked by the flat plate antero-posterior view. It is probably the complication of fractures of the

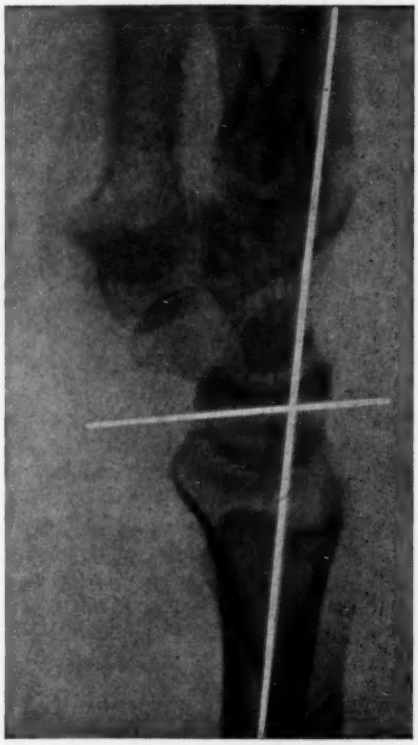

Fig. II.—Lateral view of wrist, showing Skinner's lines. Note acute angle on palmar side. This is reversed in Colle's fracture, the acute angle being on the dorsal side.

carpal bones with injury of the lower end of the radius, which results in many of the cases of prolonged disability.

The carpal scaphoid is the most frequent site of fracture. Occasionally we have a fracture of the unciform process of the unciform, giving a flail-like wrist joint, due to the fact that the ligament on the ulnar side is attached to this process. When this is broken off, the wrist on the ulnar side becomes freely movable in relationship to the ulna.

A number of years ago, Dr. E. H. Skinner of Kansas City, devised the employment of lines which are very helpful in establishing the amount of reduction necessary in Colle's fracture of the radius. One of these lines is drawn on the antero-posterior plate parallel with the mid-axis of the shaft of the radius. A perpendicular line is drawn to this line just touching the styloid process of the radius. In every normal wrist this perpendicular line will be a considerable distance distal to the styloid process of the ulna. In fractures of the lower end of the radius with shortening, the amount of shortening is shown graphically by the distance between the styloid process of the ulna and this perpendicular line. Another line is drawn on the plate in the lateral view, the line being parallel with the central axis of the shaft of the radius. Another line is drawn crossing this and touching the articular surfaces of the radius. In the normal wrist, the acute angle will usually be found on the palmar side.

Oliver Wendell Holmes

E. W. Rowe, M. D.
Lincoln, Nebraska

OLIVER WENDELL HOLMES was born August 29, 1809, and died in 1894. He saw almost the beginning and the end of the unusual nineteenth century. From a Calvinistic clergyman father he inherited a sterling character and the taste for literature. From a mother of old New England blood, the daughter of a judge and descendant of two governors of Massachusetts, he inherited a sunny disposition, full of wit, vivacity and humor. Careful home training and a good early education, followed by a course at Andover College, prepared him for Harvard. After four years' study he graduated with the famous class of 1829. It was his 21st year when Congress ordered the frigate "Constitution" destroyed. His poem "Old Ironsides" gave him immediate fame in all parts of the country, and it induced the Navy Department to rescind its order. As an alumnus, from 1851 to 1889 he returned regularly for the anniversary and class dinner, each time giving a poem. "After the Curfew," a touching poem, was his last.

For one year after graduation he studied law. For reasons hardly known to himself he gave it up and undertook the serious study of medicine. After attending two courses of lectures in the school of Dr. James Jackson he went abroad and studied, chiefly in Paris, then the medical center of Europe. Most of the time was spent with Louis, a famous French physician. The opportunities of travel, as well as his intensive medical training, gave him a polish and breadth of vision that fitted well his inherited strength of character and culture. In his own words, from Europe, we read: "I have more fully learned at least three principles since I have been in Paris—not to take authority when I can have facts; not to guess when I can know; not to think that a man must take physic because he is sick.". And again: "My aim has been to qualify myself * * * not for a mere scholar, for a follower after other men's opinions, for a dependent on their authority—but for the character of a man who has seen and therefore knows." This spirit animated his life, and as he matured he continued battling vigorously for these ideals.

On returning from Paris in 1836 he made an unsuccessful attempt to practice in Boston. He was small, humorous and witty. Staid Boston never took him seriously as a practitioner. Unfitted by taste or temperament to the life of the practice, gifted with extraordinary brilliancy, trained and cultured by the best medical education of the times, he easily became prominent as a teacher of medicine. He lectured on anatomy and physiology in Dartmouth from 1838 to 1840. In 1840 he married Amelia Lee Jackson, daughter of Hon. Charles Jackson, a well-known jurist. His eldest son was born in 1841, and after serving as a distinguished officer in the Civil War, rose to the position of an eminent jurist and author of legal books who has just rounded out his career in the United States Supreme Court.

In 1847 Harvard made Dr. Holmes Parkman Professor of Anatomy and Physiology. He delivered these lectures until 1882, long after he had retired from medical affairs. He was famous for his ability to interest his students and to take them at the end of a tiresome day and inspire them

in their work. Few writings on medical subjects came from his pen in later years. In his medical papers and teachings he was of that type of mind that saw far into the future and stimulated other minds of slower thought to work out the details.

My task is to interpret Dr. Holmes as a physician, but a word must be said of him as a literary man. To the public he is first of all a writer of literary charm and merit. Brilliant poems and elegant prose are the product of his versatile pen. Among his earlier poems, "The Last Leaf" is said to be the most pathetic and humorous in literature. "The Chambered Nautilus" reveals the soul and faith of the man. In his later days he attempted longer and more pretentious poetry and prose. But he will always remain pre-eminent for his ability to picture and popularize New England life. His real literary standing was obtained and maintained when he joined James Russel Lowell in founding a new magazine, "The Atlantic Monthly." In this "The Autocrat of the Breakfast Table," each time beginning "I was just going to say—" was immensely popular and contributed much to the financial success of the magazine. In lyric poetry he was at his best. His deep-seated resentment for the old Calvinistic theory of retribution and condemnation so stirred him that many of his writings were on subjects so developed as to bring out his more liberal ideas. These writings stirred up a great amount of criticism, equalled only by the criticism from the medical profession, so that it was only in his later years that he left controversy and enjoyed peace.

Dr. Holmes was not a politician, but he lived in stirring times. Such causes as temperance, women's rights, and abolition were the liveliest topics, and of these he frequently wrote. His Fourth of July oration delivered in Boston in 1863 was a masterpiece and showed great statesmanship.

Dr. Holmes lived mostly in Boston, going in the summer to Pittsfield and Beverly Farms. In 1886, when 75 years of age, he made a four-months' trip abroad. In England he received signal honors. Cambridge University made him Doctor of Letters, Edinburgh University made him Doctor of Laws, and Oxford University made him Doctor of Civil Laws. Already, in 1880, Harvard had made him Doctor of Laws. He died on the 7th of October, 1894, and was buried from King's Chapel, Boston, in the cemetery of Mount Auburn.

The medical essays and addresses of Dr. Holmes are numerous. He was much sought after to write and lecture. His writings helped to raise the style and tone of medical literature. He was an active participator in medical societies, being one of the members prominent in the early days of the American Medical Association. He early recognized the self-limits to disease. He helped Morton publish his work on Anesthesia. To his students in 1847 he said on this subject: "Here, almost within the present year, the unborrowed discovery first saw the light, which has compassed the whole earth before the sun could complete his circle in the zodiac. There are thousands who never heard of the American Revolution, who know not whether an American citizen has the color of a Carib or a Caucasian, to whom the name of Boston is familiar through this medical discovery. In this very hour while I am speaking, how many human creatures are cheated of pangs which seem inevitable as the common doom of mortality, and lulled by the strange magic of the enchanted goblet, held for a moment to their lips, into a repose which has something of ecstasy in its dreamy slumbers. . . . The knife is searching for disease, the pulleys are

dragging back dislocated limbs, Nature herself is working out the primal curse which doomed the tenderest of her creatures to the sharpest of her trials; but the fierce extremity of suffering has been steeped in the waters of forgetfulness, and the deepest furrow in the knotted brow of agony has been soothed forever."

We come now to his masterpiece, for which Holmes ranks among the great men of the medical profession. On February 13, 1843, Dr. Holmes read to the Boston Society for Medical Improvement his paper on "The Contagiousness of Puerperal Fever." This stirred up a storm of violent opposition from leading obstetricians such as Hodges and Meigs of Philadelphia. The medical mind was in a peculiar state at this time. The obvious was not accepted, and it was for Holmes to bring home finally the real cause of the prevalence of puerperal fever.

Dr. Holmes antedates the Vienna School several years. Yet it remained for them to work out the real prophylaxis for puerperal fever. They too carried on the contest so warmly begun and championed by Holmes in America.

Dr. Holmes' paper appeared in April, 1843, in "The New England Quarterly Journal of Medicine and Surgery," a short-lived journal of little reputation. In 1852 and 1853 his conclusions were attacked so vigorously that he added a reply to his critics in the form of an introduction, and again the paper was published. In this introduction he said: "I am too much in earnest for either humility or vanity, but I do entreat those who hold the keys of life or death to listen to me also for this once. I ask no personal favor, but I beg to be heard in behalf of the women whose lives are at stake, until some stronger voice shall plead for them.". Harvey, Jenner and Morton encountered the same difficulties. When this paper was first written he was not so well known. Later he held the position in Harvard, and the controversy became very bitter. Through it all he held a calm and consistent dignity. Of this he said, "When, by the permission of Providence, I held up to the professional public the damnable facts connected with the conveyance of poison from one young mother's chamber to another,—for doing which humble office I desire to be thankful that I have lived, though nothing else should ever come to my life—I had to bear the sneers of those whose positions I had assailed and as I believe have at last demolished, so that nothing but the ghosts of dead women stir up the ruins."

Let me briefly call attention to some of the interesting parts of Dr. Holmes' paper upon "The Contagiousness of Puerperal Fever." After three-quarters of a century it is still intensely interesting. Keep in mind how the controversy was raging at that time. In the opening paragraphs Dr. Holmes by skilful argument logically defines the special issues of his case. First in his argument he throws out all negative evidence and prepares to consider only that which is positive. To illustrate it he says it is the woman with the disease whose case should be studied. "This is like the hundredth tenant of the fold, though the ninety and nine may be escaping the wolf at its entrance." He had been told that his subject was threadbare. Yet standard authorities and teachers in places of prominence were not admitting the truth. This much he felt unnecessary to prove: "The disease known as puerperal fever is so far contagious as to be frequently carried from patient to patient by physicians and nurses."

Before proceeding to the main argument he grants the following state-

ments as obvious and common sense requires them to be accepted:

"1. It is granted that all forms of what is called puerperal fever may not be, and probably are not, equally contagious.

"2. I shall not enter into a discussion of the mode of infection. * * *

"3. It is not pretended that the contagion of puerperal fever must always be followed by disease. * * *

"4. It is granted that the disease may be produced and variously modified by many causes besides contagion and more especially, by epidemic and endemic influences. * * *

"5. I take it for granted that, if it can be shown that great numbers of lives have been and are sacrificed to ignorance or blindness on this point, no other error of which physicians or nurses may be occasionally suspected will be alleged in palliation of this, but that whenever and wherever they can be shown to carry disease and death instead of health and safety, the common instincts of humanity will silence every attempt to explain away their responsibility."

These reservations brush aside a good deal of rubbish. Though most skilfully put in a naive manner, they allow the Doctor to get at once to his main argument, and this consists in bearing on the one point of proof—that is, the contagiousness of puerperal fever. Case follows case to show that it must be contagious. Eminent authorities in all parts of the world are summoned to testify. The literature for half a century is carefully searched. Nothing is found in the American literature prior to the year 1829. But abroad, Dr. Gordon of Aberdeen in 1795 said: "I arrived at that certainty in the matter that I could venture to foretell what women would be affected with the disease, upon hearing by what midwife they were to be delivered, or by what nurse they were to be attended, during their lying-in; and almost in every instance my prediction was true.

Mr. Robertson of Manchester testifies: "A midwife delivered a woman on the fourth of December, 1830, who died soon after with the symptoms of puerperal fever. In one month from this date the same midwife delivered thirty women, residing in different parts of an extensive suburb, of which number sixteen caught the disease and all died. These were the only cases which had occurred for a considerable time in Manchester. The other midwives connected with the same charitable institution as the woman already mentioned are twenty-five in number, and deliver, on an average, ninety women a week, or about three hundred and eighty a month. None of these women had a case of puerperal fever, yet all this time this woman was crossing the other midwives in every direction, scores of the patients of the charity being delivered by them in the very same quarters where her cases of fever were happening."

Modestly he sums up the proof in this manner: "The recurrence of long series of cases, like those I have just cited, reported by those most interested to disbelieve in contagion, scattered along through an interval of half a century, might have been thought sufficient to satisfy the minds of all the inquirers that there was here something more than a singular coincidence. But if, on more extended observation, it should be found that the same ominous groups of cases clustering about individual practitioners were observed in a remote country at different times and in widely separated regions, it would seem incredible that anyone should be found too prejudiced or indolent to accept the solemn truth knelled into their ears by the funeral bells from both sides of the ocean—the plain conclusion that the physician and the disease en-

tered, hand in hand, into the chamber of the unsuspecting patient."

Next he calls attention to large cities and eminent physicians to whom the disease was almost a stranger. He says: "In view of these facts it does appear a singular coincidence that one man or woman should have ten, twenty, thirty or seventy cases of this rare disease following his or her footsteps, with the keenness of a beadle, through streets and lanes of a crowded city, while the scares that cross the same paths on the same errands know it only by name."

There is one case I have selected by which he illustrates the process of direct inoculation. "Dr. Campbell of Edinburgh states that in October, 1821, he assisted at the post-mortem examination of a patient who died with puerperal fever. He carried the pelvic viscera in his pocket to the class room. The same evening he attended a woman in labor without previously changing his clothes; this patient died. The next morning he delivered a woman with the forceps; she died also. And of many others who were seized with the disease within a few weeks, three shared the same fate in succession."

That Holmes held some of the fallacies of the day, long since disproved, appears in his argument; but when one remembers that bacteriology and modern pathology were then unknown, it detracts very little from the force of his argument. "Now add to all this the undisputed fact that within the walls of lying-in hospitals there is often generated a miasm, palpable as the chlorin used to destroy it, tenacious so as in some cases almost to defy extirpation, deadly in some institutions as the plague; which has killed women in a private hospital of London so fast that they were buried in one coffin to conceal its horrors * * *"

The occurrence of erysipelas and puerperal fever together, alternating or interchanging, led him to write: "I will only say that the evidence appears to me altogether satisfactory that some most fatal series of puerperal fever have been produced by an infection originating in like manner, or effluvia of erysipelas." A long list of references of those who held the same view follows.

Let me quote his closing argument just before the summary: "I have no wish to express any harsh feeling with regard to the painful subject which has come before us. If there are any so far excited by the story of these dreadful events that they ask for some words of indignant remonstrance to show that science does not turn the hearts of its followers into ice or stone, let me remind them that such words have been uttered by those who speak with authority I could not claim. It is a lesson rather than a reproach that I call up the memory of these irreparable errors and wrongs. No tongue can tell the heart-breaking calamity they have caused. They have closed the eyes just opened upon a new world of love and happiness; they have bowed the strength of manhood into dust; they have cast the helplessness of infancy into the stranger's arms, or bequeathed it, with less cruelty, the death of its dying parent. There is no tone deep enough for regret, and no voice loud enough for warning. The woman about to become a mother, or with her new-born infant upon her bosom, should be the object of trembling care and sympathy wherever she bears her tender burden or stretches her aching limbs. * * * God forbid that any member of the profession to which she trusts her life, doubly precious at that eventful period, should hazard it negligently, inadvisedly, or selfishly!"

In closing he gives the same practical advice that today is taught medi-

cal students when taking their courses in obstetrics.

"What course are we to follow in relation to this matter? * * * If any should care to know my own conclusions, they are the following:

"1. A physician holding himself in readiness to attend cases of midwifery should never take any active part in the post-mortem examination of cases of puerperal fever.

"2. If a physician is present at such autopsies, he should use thorough absolution, change every article of dress, and allow twenty-four hours or more to elapse before attending to any case of midwifery. * * *

"3. Similar precautions should be taken after the autopsy or surgical treatment of cases of erysipelas. * * *

"4. On the occurrence of a single case of puerperal fever in his practice, the physician is bound to consider the next female he attends in labor, unless some weeks at least have elapsed, as in danger of being infected by him. * * *

"5. If within a short period two cases of puerperal fever happen close to each other, in the practice of the same physician, the disease not existing or prevailing in the neighborhood, he would do wisely to relinquish his obstetrical practice for at least one month. * * *

"6. The occurrence of three cases * * * in the practice of one individual is prima facie evidence that he is the vehicle of contagion.

"7. It is the duty of the physician to take every precaution that the disease shall not be introduced by nurses or other assistants. * * *

"8. Whatever indulgence may be granted to those who have heretofore been the ignorant causes of so much misery, the time has come when the existence of a private pestilence in the sphere of a single physician should be looked upon, not as a misfortune, but a crime; and in the knowledge of such occurrence the duties of the practitioner to his profession should give way to his paramount obligation to society."

Dr. Holmes as a physician was preeminently a teacher and a writer. He will be known as a scientist who, seeing far in the future, almost glimpsed the modern views founded on pathology and bacteriology. He is not great in medicine because he was great in literature. But he stands out among the great men in both lines of endeavor. His brilliant mind sensed the big things on the horizon and left the details to more plodding types of mind. Dr. Holmes belongs to medical history as truly as the literary world.

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Abstracts and Reviews

The purpose of this department is to furnish its readers a succinct epitome of current interesting articles and books. We will be glad to review articles which have been presented for publication or any manuscript or book sent us.

Abstract from Letter appearing in the following Philadelphia papers: The Ledger; North American; Bulletin, Dr. George E. Pfahler.

THERE has been so much notoriety given to new discoveries in the treatment of x-rays, by more powerful rays and new technique, that a word of caution is appropriate. No new discovery has been made. The real cause of all this discussion has arisen in some one's imagination and the newspaper agitation.

Careful tests in research laboratories made by men who have recently visited Germany show that we have been using practically the same quality of rays which were used as routine in Germany, and that even the exceptional were only from ten to twenty per cent more penetrating.

In this country one experimenter has produced even more penetrating rays than have the Germans. There are no new principles, and it is not proven that more penetrating rays are more useful in the treatment of cancer. By analogy it is assumed that they will be more useful, because gamma rays of radium have a greater effect.

"The careful scientific physician takes up these advances which are made in the hope of accomplishing more for the cancerous patient, and I believe that much progress will be made; but such wild flights of the imagination in newspaper print can only arouse false hopes on the part of patients and their friends. This leads them away from known valuable methods of treatment, and makes them a prey to advertising quacks."

Service—Suggestions, Victor X-Ray Corporation, April, 1921.

THE subject of deep therapy, higher voltage, and apparatus of greater capacity is receiving considerable attention at this time. Many reports are coming from Germany, and conditions in America are being studied. It has been found that German and American engineers estimated voltage, and hence penetration, differently. In fact, the workers in the two countries are doing almost the same. Some of the German machines are capable of deliverying 20-inch spark gaps. Yet in actual practice it is doubtful if they run over ten inches according to certain American-made machines.

In Germany, when speaking, the peak voltage is always used. In this country we speak of root, mean, square voltage, or in other words, "for a ten-inch gap between points we have considered the voltage to be the equivalent of 100,000 volts r. m. s. To translate this to terms of peak voltage it is necessary to multiply by 1.4 which is the ratio between peak and root mean square voltage."

The Germans also test the spark gap between a point and a plate. A spark will jump ten per cent farther if taken this way. This also gives the impression that the Germans are using more penetration than they are.

The Germans are using larger ports of entry, greater focal distance. There is certainly a large quantity of x-ray delivered to the tissue, and if a greater quantity of rays and secondaries is desirable, it is certainly possible.

Much heavier filtration—at least one half millimeter of copper or its equivalent—is used. Treatments are given in one sitting. By means of heavier filtration the proportion of depth to skin dose is increased, since only those rays get through which affect the skin the least.

A test of one of the German induction coil types shows that when operated as per instructions the x-ray output is quite small compared with the output of a tube operating from a .. .. .. machine at five milliamperes and a voltage of ten inches between points, which correspond to 140,000 volts peak value. These, as one can readily see, represent the approximate figures at which the Coolidge tube and the .. .. .. machine are used in deep therapy.

As a result, engineers advised considerable research and experimentation before the use of machines and tubes with higher voltages should be

used for deep therapy. In order to keep the practice of roentgenology in America on the high plane where it stands today, it is necessary for all interested to make a calm and careful survey of the subject.

Study of Influenzal Pneumonia by Serial Roentgen Ray Examination. Dr. L. R. Sante, St. Louis. Jr. Missouri State Medical Ass'n, February, 1921, Vol. xviii, p. 43.

THIS paper was written on observations made in a 3,000-bed debarkation hospital during the epidemic of influenza of 1918-1920. In the study, serial roentgenograms at intervals of one to three days were taken, which aided materially in the prognosis. Several hundred cases with clinical, laboratory, and roentgen examinations were studied. A careful analysis of the cases showed six modes of invasion manifested by pneumonic processes:

1. By peribronchial invasion with small areas of consolidation which enlarge and become confluent to form solidification and are not confined to any one lobe, but affect all the lobes alike—true broncho-pneumonia.

2. Those which involve a single lobe only, but invade by the same peri-bronchial route—likewise true broncho-pneumonia.

3. Those which commence radiographically as a general haze over a part of the lung area, and progress uniformly over the entire involved area, in a measure very similar to the radiographic appearance in the invasion of a lobar pneumonia, suggestive of a lymphatic or hematogenous origin. These prove at necropsy to be an atypical broncho-pneumonia, probably the diffuse pneumonitis so often described.

4. Those which involve the hilus region only, the so-called 'critical pneumonias' of Ewing of Cornell.

5. Those which start below in the most dependent portion of the lung and spread upwards seemingly by continuity of tissue, atypical pneumonias unassociated with fluid and usually fatal.

6. Very rarely a true lobar pneumonia."

These six classes are illustrated by carefully selected roentgenograms. His conclusions are as follows:

1. That there are six general modes of invasion in the influenza-pneumonias, as revealed by serial radiographs of a large number of patients.

2. That these types of invasion suggest the medium of conveyance of the infection by blood or lymphatics or by bronchii in each case.

3. No particular type of organism is responsible for any particular type of invasion. Any type may be associated with any of the organisms commonly found—pneumococcus 1, 2, 3, 4; streptococcus, or streptococcus hemolyticus.

4. That while prognosis could not be accurately determined in all cases, in a great number a fairly accurate prognosis could be determined by careful study of serial roentgen ray plates.

Organ Stimulation by the Roentgen Ray. Dr. William F. Petersen and Dr. Clarence C. Saelhof, Chicago. Jr. A. M. A., March 12, 1921.

DIAGNOSTIC technique in roentgenology as in all other fields is outrunning the therapeutic. Knowledge of new methods in diagnosis travels fast. Roentgenologists also believe that the therapeutic effect of the roentgen ray is due to cell destruction. But the authors feel that the future development lies more in the field o fcell stimulation.

The authors recite experiments on the roentgenization of liver and kidneys, collecting bile and urine and analyzing their chief constituents. From preliminary clinical observations they believe that roentgen ray stimulation is a method of decided usefulness offered in the treatment of diabetes. Fraenkel calls attention to the effects of irradiation of ovaries in certain forms of dysmenorrhoea, the thymus and hypophysis in osteomalacia, perisoteum in non-united fractures, epiphyses of bones in children to promote growth, spleen and bone marrow in pernicious anemia, and the spleen in tuberculosis.

Secondary effects may be important. Enzymes, ani-bodies and thromboplastic substances may come out of an organ stimulated by treatment.

The roentgen ray in proper doses stimulates cellular metabolism. When organs are selectively stimulated by roentgen rays, therapeutic results can be achieved either by direct stimulation of an external secretion (kidney) or an internal secretion (the pancreas in diabetes). A second method consists in the mobilization of anti-bodies,

enzymes and thromboplastic substances following selective organ stimulation. The future of roentgenology holds much in store if study and development take place among these lines.

Radium Treatment of Uterine Fibromyomas, Journal de Radiologie et d' Electrologie. Paris, December, 1920, vol. iv, No. 12, p. 537, T. Nogier.

RADIUM is often the only means that is safe in patients too anemic, or with heart or kidney disease too far advanced to permit operative intervention. Metrorrhagia and menorrhagia are promptly arrested, even in the young. In a short time retrogression of the fibroid is usually accomplished.

The Dandy Method of Localizing Brain Tumors by the Roentgen Ray. Dr. Karl A. Menninger, Topeka, Kansas. Archives of Neurology and Psychiatry, April, 1921, p. 438.

FEW physicians realize the value of roentgen rays in the diagnosis of skull and spine pathology. The discussion and case report illustrate the importance of photographing the ventricles of the brain filled with air. The case was a boy of six years giving a history of intra-cranial pressure. Roentgenograms were made showing the separation of sutures, signs of pressure in the bony structures, an absence of sella tursica. The skull was trephined and 50 c. cfl of fluid removed from the ventricle. Air was injected. Then immediately the skull was examined by roentgen rays, showing roentgenograms in the lateral and posterior-anterior positions. The lateral ventricles were found enormously dilated to three times their normal size. This showed clearly hydrocephalus. The roentgenograms showed also that both ventricles were dilated symmetrically and equally. Fluid removed from the left ventricle must drain through the third ventricle into the right, into which the needle was inserted, and this illustration shows that the drainage was apparently incomplete. This gave a slight haziness in one, probably due to fluid. But the approximate equality of both, neither displaced beyond the midline, shows that the obstruction is cerebral. Dr. Dandy says: "Except in rare instances, only tumors in the brain stem or cerebellum can produce a symmetrical bilaterial internal hydrocephalus." The obstruction must be a neoplasm in the cerebrum, between the aqueduct (or foramen) and the foramen of Magendie.

Recently some question has been raised by Dr. Samuel T. Orton, doubting that all cases are due to cerebellar tumor. A local pressure directly on the aqueduct of Sylvius behind the anterior end would cause the same result. Tumors springing from the corpora quadrigemina, or from almost any point in the floor of the fourth ventricle, could and probably would produce the same picture. An inflammatory process might block the acqueduct. These factors should be ruled out by the clinical and special neurological tests.

The surgical treatment consisted in opening the cerebellar cavity. No tumor was found, but the search was discontinued on account of surgical limitations and the poor condition of the patient. This does not disprove the diagnosis nor lessen the value of the roentgen method. Diagnosis ran ahead of surgical limitations.

Roentgen Ray Therapy of Uterine Fibroids. T. W. Eden and F. L. Provis. Lancet, London, February 12, 1921, p. 309.

AFTER thirty years of age the method of choice in the treatment of chronic metritis with hemmorhage and no other complications should be roentgen therapy. The treatment is more easily consummated than that of fibroids. It is important to avoid treatment if the ovaries or tubes are involved by inflammation.

Fibroids not above the umbilicus, in patients over thirty-eight, may be treated by roentgen ray if the hemorrhage is of the regular monthly type, the tubes and ovaries uninvolved, and no signs of degenerative changes in the tumor are present. Intercurrent troubles may increase the operative risk; then roentgen ray is the course of choice. Often the patient should be allowed to choose after she has considered all sides of the question. All cases should first have a careful gynecological examination to exclude malignancy, inflammatory complications and degenerative changes.

The failure of roentgen treatment is so small, in properly selected cases, that it can be neglected. Symptoms of menopause come on a little

more rapidly, but there are no untoward symptoms or changes in physical condition.

An Aid in the Diagnosis of Tumor of the Urinary Bladder. D. R. Mellen, Rochester. Jr. A. M. A., March 19, 1921.

THE roentgen ray is a recent introduction in the study of the tumors of the bladder. It helps visualize the form, size and location of the tumor. It is indicated where cystoscopy is impossible on account of stricture of a prostate. Also it is applicable in cases of uncontrollable bleeding during cystoscopy, cases of intolerant bladder, and cases of contracted bladder.

A case is described in detail and roentgenograms demonstrated showing a malignant papilloma of the bladder. Sodium bromide, 15 per cent, was used for the cystogram. The tumor decreased in size by the use of radium.

The technique suggested consists in an air cystogram first, as this may show a neoplasm, then to fill the bladder with opaque solution and take a picture, and lastly to take an immediate picture of emptying the bladder.

Conclusions.

1. It is possible to demonstrate a tumor of the bladder by means of the roentgen ray.
2. The older methods, such as injecting air or an opaque media, sometimes fail.
3. It is suggested that an air cystogram should be taken first, then the bladder filled with sodium bromide solution, either 15 or 25 per cent; then take a second picture, and lastly, one immediately after emptying the bladder.

Traumatic Ossifying Myositis. Dr. Thomas G. Orr, Kansas City, Mo. The Medical Herald.

THE etiology has never been satisfactorily explained.. The predisposing factor constantly present is trauma, acute or long-sustained. Aberrant embryonic cells, true tumor formation, transformation of blood into bone, aberrant sesamoid bones, action of synovial fluid in tissues, trapho-neurotic changes, periosteal origin, inflammatory or a true metaplasm of tissue—all these are the various theories of pathologic change. The last three suit the author best. Most of the discussion concerns the explanation by periosteal development and metaplasia. True bone occurs and ossification often extends along a great length of the muscle.

The roentgen examination early reveals the presence of bone. Stages of growth and increased density may be traced. Symptoms may disappear. The difficulty of diagnosis is not great. Sarcoma must be eliminated.

The prognosis is good. It is left alone if it does not interfere with function; absorption may take place. Operation should not be performed early on account of danger in recurrence. Removal, if attempted, should be thorough.

Childhood Tuberculous Lymphadenitis: Its X-Ray Findings and Diagnostic Significance. Dr. Maximilian John Hubeny, Chicago. International Clinics, Vol. I, 31 series, p. 110.

MEDICAL propaganda through the profession and the laity have made tuberculosis secondary to heart lesions as a cause of death.

The roentgen ray has established itself as a diagnostic and therapeutic agent with limitation and usefulness. All clinical, pathological and bacterial data should enter into consideration of cases.

Pulmonary and pleural tuberculosis, with or without glandular involvement of the mediastinum, bronchial, tracheal, and broncho-pulmonary areas, offer the most tangible findings. The roentgen therapeutic aspects of tuberculous adenitis is mentioned with enthusiasm. Its use is not new. Its application has proven its value. The advantages are many, such as these: There is no mutilation, no tendency toward metastasis, no permanent derangement. There is a high percentage of cures. On account of the widespread infection, complete radical removal by surgery may be impossible. Roentgen rays favorably affect the blands that are diseased as well as those in the surrounding territory. Some glands cannot be reached surgically, such as those in the chest and abdomen. Roentgen rays offer me relief in tuberculous affections of the tracheal and bronchial lymph nodes. Dysphagia and dyspnoea are much relieved. Results are uniformly good.

The lymphatic system is readily and easily affected by the roentgen ray. The selective action in other words is

marked. The effect is destructive, The growth of connective tissue is stimulated and cicatrization follows. Pirie believes another important factor is the destruction of giant cells. This destroys the protection of the tubercle bacilli and allows the leucocytes to destroy them in turn. There is no demonstrable effect on the bacilli themselves. Serological changes in the organism may be obtained, accounting for the changes in disease areas in distant parts of the body undergoing treatment.

If treatment is not too severe, the opsonic index will steadily rise.

The roentgen rays bring about actual destruction of the tuberculous granulation tissue. In the surrounding tissue active hyperaemia occurs, crowding the vessels with leucocytes which promote absorption, and in time wall off the diseased area by connective tissue.

From the standpoint of roentgen therapy three types are mentioned:

1. Simple tuberculous, non-suppurating lymphoma.
2. Closed suppurating or partly caseating lymphoma.
3. Open suppurating and caseating lymphoma with fistula.

Group one occurs most often in children and requires six to eight weeks as a rule to treat successfully. The second group is favorable to treatment if no inflammatory signs are present.

If inflammation is present, incision and drainage is usually necessary to secure good results.

The third group yields slowly, the tract first dries up and then the more distant parts subside. The older the fistulae, the longer time necessary.

Technique.

Adults: 10 Holzknecht units every three or four weeks; 4 mm. filtration; 9½ inch spark gap, 5 milliamperes, cross-fire if possible. In children, 6 Holzknecht units will suffice.

Areas containing any of the ductless glands, or those susceptible, should be carefully protected. The response may even be a test for the accuracy of diagnosis. Tuberculous glands yield slowly, but those of leukemia and pseudoleukemia literally melt away, often in a few days.

E. W. ROWE.

X-Ray Pictures of the Bones in the Diagnosis of Syphilis in the Fetus and Young Infants. P. G. Shipley, J. W. Pearson, A. A. Weech and C. H. Green. Bulletin of The Johns Hopkins Hospital, March, 1921, pp. 75-77.

A NEGATIVE Wassermann in the new-born is of little value in the diagnosis of syphilis. The tendency is to extend this "capricious" action until the end of the fourth month. The diagnosis of syphilis is so difficult and yet so important in the new-born that any assistance from the x-ray is of great importance. All syphilitic infants do not show bone changes or clinical and serological changes, but the bones which do show syphilitic changes are so easy of recognition as to be pathognomonic.

Three hundred white fetuses ranging in age from the sixth month of intrauterine life to nearly term, normal and pathological, were studied with roentgenograms. Syphilis easily stood out as the great factor in their death. In the first hundred plates studied, 15 showed advanced luetic changes, 10 had signs of less marked syphilitic involvement, and 21 showed one or more bones which presented slight variations. "In other words, 25 had marked signs of lues, and 46 out of 100 bodies examined had well-marked or suspicious lesions."

The lesions were of two types (1) those seen in the new-born, and (2) those seen in the bones of older children. The normal bone pictures are carefully described. We are more concerned with the syphilitic.

Syphilitic bones are characteristic on roentgenograms. All bones are not affected to the same extent. The order of frequency is as follows: The lower end of the femur, the distal and proximal ends of the tibia, the distal ends of the radius and ulna, the extremities of the metacarpals, the proximal ends of the phalanges, and the proximal ends of the ulna and radius. No bones are exempt.

The syphilitic changes in the bones of the fetus, unless of severe or long standing, do not involve the periosteum to any extent, but are confined to the epiphyseodiaphyseal region. At birth periosteal changes begin to occur, and in young infants this may be the most marked skeletal lesion.

The first change shown on the roentgenogram is an intensification of the bone at the epiphyseal line. This broadens, becomes homogenous, and seems to form a cap on the ends of the trabeculae of the spongiosa. Ab-

normally heavy calcification of the provisional calcified zone goes progressively forward. This width may be exaggerated to .5 mm. and to 1.5 mm. Bones may be seen in which this calcification is irregular, due to rarefaction in small areas. At other times the bones end in double heavy lines, corresponding to the zone shown by histological examination to contain granulations. This increases in intensity as the process goes on. Irregularity becomes marked until finally the bone becomes jagged in appearance. The epiphyseal border appears jaw-toothed or serrated.

Periostitis, when it occurs near term in severe cases, may be present throughout the length of the bone or only at the extremities. It shows in longitudinal striations separated from the external surface of the cortex by a narrow clear area which bounds the bone. In the roentgenogram the trabeculae of the syphilitic bone appear to be finer than in normal bone.

Scurvy and rickets must be differentiated. In earlier weeks neither need be considered. Fetal rickets never occurs. Scorbutus is rare before the sixth month.

Lues of the fetus and newly born child interferes little if at all with skeletal growth.

E. W. ROWE.

The Effect of Phosphorus in Rickets. Dr. D. B. Phemister, Dr. E. M. Miller, Dr. B. E. Bonar, Chicago. Jour. A. M. A., March 26th, 1921, p. 850.

"IN PREVIOUS studies Phemister showed in roentgen ray studies the influence of phosphorus on the growth of normal bones and the bones in the growth disturbance of osteogenisis imperfecta and dyschondroplasia. A dense shadow formed at the growing ends of the shafts, which gradually increased in thickness as long as the phosphorus was given, but gradually faded after the discontinuance of the drug. Further doses demonstrated that it influenced the longitudinal growth of the bones, but not the transverse in the normal bones. But in osteogenesis imperfecta the transverse increase was as noticeable in the transverse as in the longitudinal."

Dr. Phemister has also repeated the Wegner experiments showing that the "shadows are found to be due to a layer of densely packed, longitudinally arranged, bony trabeculae that form excessive activity in the zone of ossification at the end of the shaft."

Illustrations are given showing the effect of phosphorus administered for various periods of time. Some show the effects of phosphorus alone, and some with cod liver oil. The end results of phosphorus and cod liver oil were the same as with phosphorus alone. Rarefied areas in rachitic bones acquired an approximately normal density in both instances. The method of action is little understood. Clearly phosphorus and cod liver oil restored the power of normal ossification, which in rickets is temporarily lost.

E. W. ROWE.

Postural Rest for Pulmonary Tuberculosis. Dr. G. B. Webb, Dr. A. M. Forster, Dr. G. B. Gilbert, all of Colorado Springs. Jour. A. M. A., March 26, 1921. ....

THIS article has been selected because it illustrates how dependent the clinicians are upon roentgen study; also, how helpful the roentgen laboratory may be where the co-operation is close.

Rest is the most approved aid in the treatment of tuberculosis. It has been neglected or inadequately carried out in pulmonary tuberculosis. It is best carried out in patients without two badly affected sides. When the affected side is down in the recumbent position, it gradually becomes quieter and less expanded. Hyperaemia develops, which is also of benefit. Patients submit readily to the treatment, expectoration becomes less, fever subsides, and cough ceases. A pillow may be used to compress the recumbent side. It seems to have all the advantages of artificial pneumothorax.

Case histories and roentgenograms are included, showing the effect of position in normal individuals and those affected with tuberculosis. These are confirmed by other similar data secured at the U. S. General Hospital No. 1.

E. W. ROWE.

Errors in Diagnosis in Treatment of Duodenal Ulcer. J. D. Dunham, American Journal of the Medical Sciences, November, 1920.

THE writer quotes Moynihan, disapprovingly: "It is therefore not necessary to the attaining of a diagnosis that any examination of the patient be made: the anamnesis is

everything, the physical examination is relatively nothing." The writer insists on the fullest examination, namely chemical tests of stomach contents, stools, urine, blood count, a Wassermann, and insists on a fluoroscopic examination of the chest and abdomen. Fluoroscopy of the chest will sometimes show an enlarged aorta suggesting an aortitis, which condition in turn points to syphilitic duodenal ulcer or visceral lues, either of which condition is usually confused with a simple chronic duodenal ulcer. He emphasizes the diagnostic importance of an early hyperperistalsis followed by a later hypoperistalsis and duodenal distortion. In his experience duodenal ulcer has rarely been associated with visceroptosis. A distortion of the duodenal cap accompanied by local tenderness is strong evidence of duodenal ulcer.

J. H. DEMPSTER, M. D.

Roentgenological Aspects of Lower Right Quadrant Lesions. F. H. Baetjer, M. D., and Julius Friedenwald, M. D., Baltimore, Md. The American Journal of Medical Sciences, November, 1920.

THE writers mention the following among the affections of the lower right quadrant of the abdomen: 1, Appendicitis, 2 Incompetent ileocecal valve and ileal stasis, 3 Dilatation of the cecum with retention, 4 Adhesions and angulations, 5 Ulcerations due to tuberculosis, 6 Ulcerations due to carcinoma. In studies of the lower right quadrant lesions, the authors use both the opaque meal and the opaque enema. The opaque meal ordinarily reaches the cecum in five to eight hours. Delay in the passage of the opaque residue may be due to dilatation of the cecum, to ptosis, to adhesions or to ileal stasis and angulations. In determining lesions of the lower right quadrant the authors place the patient in the knee chest position and use a low enema, allowing it to run in slowly by gravity.

Chronic appendicitis: In very chronic forms of appendicitis the lumen of the appendix may be completely closed as a result of the obliterative inflammatory process, in which case the appendix may not be seen. The appendix should fill in 6 hours, especially under fluoroscopic palpation. When the appendix remains visible more than 24 hours after the examination, or if the cecum has emptied itself, it is potentially dangerous in proportion to its poor drainage. The majority of retrocecal appendices show tenderness upon fluoroscopic palpation. In those cases in which there is no tenderness on direct palpation, the authors say appendicitis may be excluded. According to Pfahler, a localized tenderness over a fixed cecum even if the appendix is not visualized, means a pathologic appendix. The writers claim that not every visualized appendix is of necessity diseased. This is particularly so if the appendix can be found well filled with bismuth, lying practically free, no signs of adhesions and emptying with the emptying of the cecum. When, however, the appendix is found filled with barium curled up and fixed, this points to a pathologic process. The kinking of the appendix, which remains constantly pointing towards the gallbladder, must be viewed with suspicion. Adhesions associated with the appendix must extend to adjacent structures and thus produce varying degrees of cecal and ileal stasis even to partial obstruction of the colon.

Chronic appendicitis may at times give rise to symptoms which point to duodenal ulcer, that is, reflexly we get a gastric and duodenal hypermotility with a definite deformity of the duodenal cap. These cases call for repeated examination and close study of the plates together with clinical history.

Incompetent Ileocecal Valve and Ileal Stasis: As a diagnostic sign of this condition, we have the ileum entirely empty 24 hours after partaking of the barium meal and at the end of 36 hours to 48 hours the terminal ileum may be filled, which points to a regurgitation from the cecum to the ileum due to incompetent ileocecal valve. The ileocecal valve is normally competent, hence the reflux of the opaque meal from the colon into the ileum is looked upon as a sign of incompetency.

Dilatation of the cecum with retention: Cecal stasis may be associated in some cases with chronic appendicitis or it may be due to a high degree to interoptosis. The roentgen ray examination of the dilated cecum has thrown more light upon this type of constipation in which the patient may not complain of constipation maintaining that the bowels move

regularly every day. The barium mass will be found adherent to the side of the cecum allowing a small channel in the center. This condition points to a low grade inflammation of the cecum, which frequently involves the appendix also. This undoubtedly accounts for cases in which the removal of the appendix is not followed by any marked benefit to the patient.

Adhesions and Angulations: The terminal portion of the ileum is a common seat for adhesions, which may produce angulation and kinks in the bowel at this location.

Tuberculous Ulcerations: The writers draw attention to the importance of the x-rays in the diagnosis of intestinal tuberculosis. The radiogram shows hypermotility of the bowel often with complete evacuation in from twenty to twenty-four hours. The most important sign is the spastic condition of the bowel involving the usual cecum and cecocolon. There is also an irregular appearance presenting definite filling defects at the seat of the lesion. The presence of intestinal hypermotility, spasm and filling defect give in a patient with pulmonary tuberculosis almost definite evidence of a chronic tuberculosis.

Ulcerations due to carcinoma: In this condition, we have a definite filling defect persistent in all the plates. There is likewise localized tenderness on fixation. The writers caution against a diagnosis of carcinoma from filling defects observed at a single examination. The examination should be repeated after the bowels have been thoroughly cleaned by means of cathartics and enemata. The barium enema is the method of choice for the examination of colonic growths. In conclusion, the writers strongly impress the necessity of correlating the roentgen findings with the clinical findings. No one method of diagnosis must be looked upon as absolute.

J. H. DEMPSTER, M. D.